



Safety Data Sheet

Produced water, sour

1. Identification

GHS product identifier: Produced water, sour	Version #: 01
Synonyms: Sour water.	Issue date: 07/31/2013
	Revision date: 07/31/2016
	Supersedes date: Previous to 07/31/2013
CAS #: Mixture	
Recommended use: Product produced at Encana well sites. Includes liquids, except for gas condensates generated from a producing well.	
Recommended restrictions: Use in accordance with this SDS.	
Manufacturer: Encana Oil & Gas (USA) Inc. 370 17 th Street, Suite 1700 Denver, CO 80202	
Emergency phone #: 866-244-0062 911	Email: SDS@encana.com

2. Hazard identification

GHS classification & label elements

Signal word: Warning			
Type of Hazard		Category	Hazard Symbol
Physical Hazards	Flammable liquids	3 3	
Health Hazards	Skin corrosion/irritation Reproductive toxicity Acute toxicity, inhalation	3 2 2	
Environmental Hazards	Hazardous to the aquatic environment, long-term hazard	2	

Hazard statement

- Causes mild skin irritation.
- Suspected of damaging fertility.
- Toxic to aquatic life with long-lasting effects.
- Poisonous by inhalation.

Precautionary statement

Prevention:

- Do not handle until all safety precautions have been read and understood.
- Obtain special instructions before use.
- Keep away from flames and hot surfaces— no smoking.
- Use personal protective equipment to prevent contact, as determined by assessing hazards and likely routes of exposure.
- Avoid release to the environment.

Response:

- In case of fire, use alcohol-resistant foam, carbon dioxide, dry powder, or water fog for extinction.
- If exposed or concerned, get medical advice/attention.
- Collect spillage if safe to do so.

Storage:

- Store in a well-ventilated place.
- Keep cool.
- Store locked up.

Disposal:

- Dispose of contents/container in accordance with local, regional, national, and international regulations.

Special hazards

- Direct contact with eyes may cause temporary irritation.
- Prolonged contact may cause dryness of the skin.

Hazards not otherwise classified:

- None.

3. Composition / information on ingredients

Components	Common Synonyms	CAS #	Percent (1)
Octane		111-65-9	1-<10%W
Decane		124-18-5	1-<5%W
Heptane		142-82-5	1-<5%W
n-Hexane		110-54-3	0.1-<2.5%W

Components	Common Synonyms	CAS #	Percent (1)
Hydrogen sulfide (2)	H ₂ S, sour gas, sewer gas, hydrosulfuric acid	7783-06-4	>0.03V

Notes: V=volume, W=weight. (1) All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are listed as percent by volume. (2) Hydrogen sulfide concentrations as noted above may produce immediately dangerous to life and health (IDLH) levels in the gas phase of closed system due to breakout.

4. First aid measures

First aid procedures

Inhalation:

- Move to fresh air.
- Get medical attention if discomfort develops or persists.
- **If there is any suspicion of inhalation of H₂S**, follow these measures:
 - Rescuers must wear breathing apparatus and follow rescue procedures.
 - Remove casualty to fresh air as quickly as possible.
 - Immediately begin artificial respiration if breathing has ceased.
 - Provision of oxygen may help.

Skin contact:

- Remove contaminated clothing.
- Wash with soap and water.
- For rashes, wounds, or other skin disorders, seek medical attention and bring along this SDS.

Eye contact:

- Remove any contact lenses and open eyelids wide apart.
- Immediately flush with plenty of water for up to 15 minutes.
- Get medical attention if irritation or symptoms persists

Ingestion:

- Rinse mouth.
- Never give anything by mouth to an unconscious person.
- Do not induce vomiting unless told to do so by a poison control center or doctor.

Most important symptoms/effects (acute & delayed)

- Inhalation of H₂S gas can cause respiratory or cardiac arrest.
- May cause redness and pain.
- May cause eye irritation on direct contact.

Notes to physician

- Treat symptomatically.
- The effects might be delayed.

General advice

Get medical attention if any discomfort develops.

5. Fire-fighting measures

Flammable properties

- Product is flammable.
- Heat may generate vapors that may form explosive vapor/ air mixtures.
- See Sections 9 and 10 for physical/chemical and stability/reactive properties.
- NFPA: Health: 4, Flammability: 2, Instability: 0.

Extinguishing media

Suitable	Do not use
<ul style="list-style-type: none"> Water spray Fog Carbon dioxide (CO₂) Dry chemical <i>or</i> Alcohol-resistant foam 	<ul style="list-style-type: none"> Water jet, which will spread the fire. Simultaneous use of foam and water on the same surface, as water destroys the foam.

Protection of fire-fighters

Specific hazards arising from the chemical	Protective equipment and precautions
<ul style="list-style-type: none"> The product is flammable; heating may generate vapors which may form explosive vapor/air mixtures. Combustion may emit SO₂. 	<ul style="list-style-type: none"> Fire-fighters must wear full protective clothing and a self-contained breathing apparatus (SCBA) when fighting fire in poorly ventilated area. Use SCBA or SABA respirator if exposure to SO₂ is likely.

Fire-fighting equipment / instructions

- Use standard firefighting procedures and consider the hazards of other involved materials.
- Move containers of the product from fire area if you can do it without risk.
- Use water spray to cool unopened containers.
- Cool containers with flooding quantities of water until well after fire is out.

6. Accidental release measures

Personal precautions

- Avoid prolonged and repeated contact.
- Wear suitable protective clothing (See Section 8 of this SDS).

Environmental precautions

- Avoid discharge into drains, water courses, or onto the ground.

Methods of containment

- Do not allow to enter drains, sewers, or watercourses.

Methods for cleaning up

- Small spills: absorb spillage with suitable absorbent material.
- Large spills: use a non-combustible material like vermiculite, sand, or earth to soak up the product and place into a container for later disposal.
- For waste disposal, see Section 13 of this SDS.

7. Handling and storage

Handling

- Avoid contact with eyes and prolonged or repeated contact with skin.
- Pregnant women should not work with the product, if there is any risk of exposure.
- Keep away from heat, spark, open flames, and other sources of ignition.
- Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, hydrogen sulfide (H₂S), and flammability.
- Wash hands after handling and before eating.
- Observe good hygiene practices.
- HMIS®: Health: 4, Flammability: 2, Physical hazards: 0.

Storage and incompatibilities

- Follow rules for flammable liquids.
- Keep away from heat, sparks, and open flame.
- Keep in a cool, well-ventilated place.
- Keep away from food, drink, and animal feeding materials.
- Keep away from incompatible materials: water reactive materials and strong oxidizing agents (Section 10).
- Store locked up.

8. Exposure controls / personal protection

Occupational exposure limits

Components	Limit Type	OSHA PEL	ACGIH TLV	NIOSH REL
Heptane (CAS 142-82-5)	STEL	None	500 ppm	440 ppm
	TWA	500 ppm	400 ppm	85 ppm
n-Hexane (CAS 110-54-3)	TWA	500 ppm	50 ppm	50 ppm
Hydrogen sulfide (CAS 7783-06-4)	STEL	20 ppm (Ceiling)	5 ppm	10 ppm (Ceiling)
	TWA	50 ppm 10 min Max Peak	1 ppm	None
Octane (CAS 111-65-9)	STEL	375 ppm	None	385 ppm (Ceiling)
	TWA	500 ppm	300 ppm	75 ppm

Notes: PEL=permissible exposure limit; ppm=parts per million; REL=recommended exposure limit; TVL=threshold limit value; TWA=time-weighted average. * Limits contained in 29 CFR 1910.1000 Z-2 may apply. All values are based on 2012 standards.

- Recommended monitoring** Follow standard monitoring procedures per established OSHA or NIOSH methods.
- Engineering controls**
- Provide adequate ventilation and minimize the risk of inhalation of vapors.
 - Provide easy access to water supply and eye wash facilities.
 - Use explosion-proof equipment.
- Personal protective equipment**
- Eye/face protection:
- Risk of contact: wear safety glasses with side shields (or goggles).
- Skin protection:
- Risk of contact: anti-static and flame-retardant protective clothing is recommended.
 - Wear protective gloves, such as nitrile or butyl rubber.
 - Frequent glove change is advised.
 - Suitable gloves can be recommended by the glove supplier.
- Respiratory protection:
- An approved respirator must be worn if engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established).
 - A buddy system, supplied air breathing apparatus, and an escape pack may be required.
 - Respirators do not protect against a potentially flammable environment; appropriate precautions must be taken in potentially explosive environments.
 - Industrial hygienists should monitor personal exposure to determine the need for a respirator.
- General hygiene**
- When using, do not eat, drink, or smoke.
 - Wash hands after handling.
 - Launder contaminated clothing before reuse.
 - Private clothes and working clothes should be kept separate.
 - Handle in accordance with good hygiene and safety practice.
 - Observe any medical surveillance requirements.

9. Physical and chemical properties

Physical state	Liquid
Form	Liquid
Color	Colorless to brown
Odor	Rotten egg
Odor threshold	Not available
pH	4.3–6.8

Melting point / freezing point	-15–32°F (-26.1–0°C)
Initial boiling point	212°F (100°C)
Boiling range	Not available
Flash point	84–210°F (28.9–98.9°C)
Evaporation rate	Not available
Flammability (solid, gas)	Not available
Flammability limits in air, lower to upper (% by volume)	Not available
Vapor pressure	0.1–1.8 psi (Reid Vapor Pressure at 100°F).
Vapor density	Not available
Relative density	1.01–1.08
Solubility(water)	Soluble
Partition coefficient (n-octanol/water)	Not available
Auto-ignition temperature	Not applicable
Pour point	Not available
Viscosity	Not available
Oxidizing properties	Not available
Explosive properties	Not available
Decomposition temperature	Not applicable

10. Stability and reactivity

Reactivity Not available.

Chemical stability Material is stable under normal conditions.

Possibility of hazardous reactions Hazardous polymerization does not occur.

Conditions to avoid

- Excessive heat.
- Contact with incompatible materials.

Incompatible materials

- Water reactive materials.
- Strong oxidizing agents.

Hazardous decomposition products

- May produce oxides of sulfur.

11. Toxicological information

Toxicological data

Component	Species	Test Results
Decane (CAS 124-18-5)		
Acute <i>Inhalation</i>		
LC50	Mouse	72.3 mg/L, 2 hours
Heptane (CAS 142-82-5)		
Acute <i>Inhalation</i>		
LC50	Rat	103 mg/L, 4 hours
Octane (CAS 111-65-9)		
Acute <i>Inhalation</i>		
LC50	Rat	118 mg/L, 4 Hours
Hydrogen Sulfide (CAS 111-65-9)		
Acute <i>Inhalation</i>		
LC50	Rat	>0.38 mg/L, 960 minutes

Notes: LC50=half maximal lethal concentration; mg/L-milligrams per liter.

- Routes of exposure**
- Absorption
 - Eye contact
 - Inhalation of vapor

Toxicological effects Occupational exposure to the substance or mixture may cause adverse effects.

Acute toxicity:

- Skin irritation.
- Ingestion may cause irritation and malaise.
- Hydrogen sulfide (H₂S), a highly toxic gas, may be present.
- Signs and symptoms of overexposure to hydrogen sulfide include the following:
 - respiratory and eye irritation
 - dizziness
 - nausea
 - coughing
 - a sensation of dryness and pain in the nose
 - loss of consciousness
- Odor does not provide a reliable indicator of the presence of hazardous levels of H₂S in the atmosphere.

Chronic effects:

- Can cause kidney, liver, and central nervous system damage.
- Prolonged or repeated contact with skin may cause redness, itching,

irritation, eczema/chapping, and oil acne.

- Contains n-hexane, prolonged or repeated exposures to which may cause damage to the peripheral nervous system (e.g., fingers, feet, and arms).

Skin corrosion/irritation	Irritating to skin.
Serious eye damage / eye irritation	Not classified.
Sensitization	Not a skin sensitizer.
Local effects	<ul style="list-style-type: none"> ▪ May cause eye irritation. ▪ May produce skin irritation or contact dermatitis.
Mutagenicity	Not classified.
Carcinogenicity	Not classified.
Reproductive toxicity	Suspected of damaging fertility.
Specific target organ toxicity—single exposure	Not classified.
Specific target organ toxicity—repeated exposure	Not classified.
Symptoms	<ul style="list-style-type: none"> ▪ May cause redness and pain. ▪ May cause eye irritation on direct contact.
Epidemiology	No data available.
Absorption hazard	Not classified.

12. Ecological information

Ecological data

Components	Dose	Species	Test Results
Decane (CAS 124-18-5)			
Fish	LC50	Sheepshead minnow (<i>Cyprinodon variegatus</i>)	>500 mg/L, 96h
Heptane (CAS 142-82-5)			
Fish	LC50	Mozambique tilapia (<i>Tilapia mossambica</i>)	375 mg/L, 96h

n-Hexane (CAS 110-54-3)

Fish	LC50	Fathead minnow (<i>Pimephales promelas</i>)	2.101–2.981 mg/L, 96h
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Hydrogen sulfide (CAS 7783-06-4)

Fish	LC50	Lake whitefish (<i>Coregonus clupeaformis</i>)	0.002 mg/L, 96h
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Notes: LC50=half maximal lethal concentration; mg/L-milligrams per liter.

Ecotoxicity Toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

Environmental effects Toxic to aquatic life with long lasting effects.

Persistence and degradability Expected to be inherently biodegradable.

Bioaccumulative potential Has the potential to bioaccumulate.

Partition coefficient (n/octanol/water [log K_{ow}])

n-Hexane (CAS 110-54-3)	3.9
Heptane (CAS 142-82-5)	4.66
Decane (CAS 124-18-5)	5.01
Octane (CAS 111-65-9)	5.18
Hydrogen sulfide (CAS 7783-06-4)	NV

Mobility in soil This product mostly contains water, which has a high mobility in soil. The organic components, however, have varying degrees of mobility in soil:

- Decane, octane, and heptane have high koc values and are immobile or have low mobility in soil.
- n-Hexane has a low koc value and is considered to have high mobility in soil.
- Hydrogen sulfide spilled onto soil will mostly evaporate; however, it has a high mobility in soil and may sink into soil.

Soil organic carbon-water partition coefficient (koc)

n-Hexane (CAS 110-54-3)	130
Heptane (CAS 142-82-5)	8,200
Octane (CAS 111-65-9)	16,000
Decane (CAS 124-18-5)	22,200–42,700
Hydrogen sulfide (CAS 7783-06-4)	NV

Water solubility The product is water soluble; however, the alkane components have very low solubility.

Other adverse effects None known.

13. Disposal considerations

Disposal methods	Dispose of in accordance with all applicable regulations.
Local disposal regulations	Dispose of in accordance with all applicable regulations.
Waste from residues / unused products	Dispose of in accordance with local regulations.
Contaminated packaging	Empty containers should be sent to an approved handling site for recycling, recovery, or disposal.

14. Transport information

DOT

UN number	UN1267
UN proper shipping name	Petroleum crude oil, Marine pollutant
Transport hazard class(es)	3
Packing group	III
Environmental hazards: Marine pollutant	Yes
Labels required	3
Special provisions	144, 357, B1, IB3, T2, TP1
Packaging exceptions	150
Packaging non bulk	203
Packaging bulk	242
Special precautions for user	Read safety instructions, SDS, and emergency procedures before handling.

IATA

UN number	UN1267
UN proper shipping name	Petroleum crude oil
Transport hazard class(es)	3
Packaging group	III
Environmental hazards	Not available
Labels required	Not available
ERG Code	Not available
Special precautions for user	Not available

IMDG

UN number	UN1267
UN proper shipping name	Petroleum Crude Oil
Transport hazard class(es)	3
Packaging group	III
Environmental hazards: Marine pollutant	Yes
Labels required	3
EmS	F-E, S-E
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable
General information	Not applicable

15. Regulatory information

US federal regulations This product is not a hazardous chemical.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001–1050) None.

CERCLA (Superfund) reportable quantity

n-Hexane (CAS 110-54-3)	5,000 lbs
Heptane (CAS 142-82-5)	Not listed
Octane (CAS 111-65-9)	Not listed
Decane (CAS 124-18-5)	Not listed
Hydrogen sulfide (CAS 7783-06-4)	100 lbs

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

- Immediate Hazard: Yes
- Delayed Hazard: Yes
- Fire Hazard: Yes
- Pressure Hazard: No
- Reactivity Hazard: No
- SARA 302 Extremely hazardous substance: No
- SARA 311/312 hazardous chemicals: No

International Inventories

Country(s) or region	Inventory name	On inventory (Yes/No) *
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
US & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

Notes: *A Yes indicates this product complies with the inventory requirements administered by the governing country(s).

16. Other information, including date of preparation or last version

Issue date 07/31/2013

Revision date: 07/31/2016

Version # 01

References IARC Monographs. Overall Evaluation of Carcinogenicity (Volumes 1–102)
IUCALD. Hazardous Substances Data Bank.

Disclaimer This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.