

Safety Data Sheet: Produced Water, Sweet or Sour

1. Identification

Product Name: Produced Water, Sweet or Sour

Synonyms: Formation Water, Salt Water, H₂O, Oily Water; Sweet and Sour

Product Use: Water extracted from oil or natural gas well production, process stream, waste

EP Energy
1001 Louisiana Street
Houston, Texas 77002

Information: (713) 997-1000 or 855-269-0826
O'BRIEN'S: (985) 781-0804 24/7

2. Hazard(s) Identification

Note: This material has not been tested by EP Energy to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information on the product components.

GHS Classifications

H226: Flammable liquid & vapour
H350: Carcinogenicity, Category 1
H320: Eye Irritant, Category 2B
H315: Skin Irritant, Category 2

GHS Label Elements



Signal Word: Danger

GHS Hazard Statements

May contain or release poisonous hydrogen sulfide gas
H226: Flammable liquid & vapour
H350: May cause cancer.
H320: Causes eye irritation.
H315: Causes skin irritation.

Hazards Not Otherwise Classified

Precautionary Statement(s)

Prevention:

P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat/sparks/open flames/hot surfaces – no smoking.
P270: Do not eat, drink or smoke when using this product.
P281: Use personal protective equipment as required.
P264: Wash thoroughly after handling.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P308+P313: IF exposed or concerned: Get medical advice/attention.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P332+P313: If skin irritation occurs: Get medical advice/attention.
P362: Take off contaminated clothing and wash before reuse.
P370: In case of fire: Use dry chemical, carbon dioxide, or foam for extinguishing.

Storage:

P405: Store locked up.

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Disposal:

P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

3. Composition/Information on Ingredients

Note: Composition will vary with geographic location, geologic formation, temperature and pressure.

Components	CAS No.	Wt% ⁽¹⁾
Water	Mixture	>68
Mineral Variety ⁽²⁾	Varies	<32
Crude Oil (Petroleum)	8002-05-9	<1
Benzene	71-43-2	<1
Hydrogen Sulfide	7783-06-4	Varies

⁽¹⁾Normal composition ranges are shown. Exceptions may occur depending upon the source of the produced water.

⁽²⁾Actual composition is unknown, but may contain Sodium Chloride (CAS No. 7647-14-5), Potassium Chloride (CAS No. 7447-40-7) and/or Calcium Chloride (CAS No. 10043-52-4)

4. First-Aid Measures

- Inhalation:** If respiratory symptoms develop, move victim to fresh air. Seek immediate medical attention if symptoms persist. If breathing has stopped and airway is clear, provide artificial respiration. Do not use mouth-to-mouth method if victim ingested the substance. Provide artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult, if qualified. Seek immediate medical attention.
- Skin Contact:** Remove and isolate contaminated clothing and shoes. Wash affected areas with soap and water. If irritation persists, seek medical attention. Decontaminate clothing before reuse.
- Eye Contact:** Flush eyes with large amounts of water for at least 15 minutes, occasionally lifting the eyelids. Seek medical attention.
- Ingestion:** DO NOT INDUCE VOMITING. If spontaneous vomiting occurs, place on the left side with head down to prevent aspiration of liquid into the lungs. Have exposed individual rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person. Do not leave victim unattended. Monitor for breathing difficulties. Seek immediate medical attention.

Notes to Physician: This material may contain or liberate hydrogen sulfide. In high doses, hydrogen sulfide may produce pulmonary edema and respiratory depression or paralysis.

5. Fire-Fighting Measures

NFPA Ratings: Health: 1 Flammability: 1 Reactivity: 0

General Fire Hazards:

Flammable. Fire is associated with crude oil and natural gas liquids floating on surface of produced water and their vapors. May be ignited by heat, sparks or flames or other sources of ignition. Vapors may reach an ignition source, and flashback. Runoff to sewer may create fire or explosion hazard downstream from the source. Gases may form explosive mixtures with air. BLEVE'S (Boiling Liquid Expanding Vapor Explosions) can occur when a liquid in a pressurized container is heated to temperatures beyond its boiling point. This can lead to failure of the container and damage to the surrounding area. May react with strong oxidizing materials and a wide variety of chemicals.

Hazardous combustion/decomposition products may include carbon monoxide, carbon dioxide, hydrocarbons, nitrogen oxides and sulfur oxides. Hydrogen sulfide may be present. Downwind personnel must be evacuated.

Extinguishing Media:

Dry chemical, foam, carbon dioxide or water spray. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Unsuitable extinguishing media: Do not use a solid water stream. Water and foam should not be used together on the same surface as water destroys the foam. Water should be used as a spray to keep surrounding areas cool.

Fire Fighting Instructions:

Move containers from fire area if you can do it without risk. Use a smothering technique for extinguishing fire. Do not use a forced- water stream as this will scatter the fire. Use a water spray to cool fire-exposed containers and surrounding areas until well after fire is out. Do not direct water at source of leak or safety devices as icing may occur. Dike fire-control water for later disposal; do not scatter the material. Firefighters

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should wear self-contained breathing apparatus and full protective clothing. Refer to Section 8 for appropriate PPE selection.

Precautions for Fire Involving Tanks or Car/Trailer Loads:

Always stay away from tanks engulfed in flame. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. If unmanned hose holders or monitor nozzles cannot be used, withdraw from area and let fire burn.

6. Accidental Release Measures**Personal Precautions:**

Extremely Flammable. Spillage of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof electrical equipment is recommended. Product may contain or release poisonous hydrogen sulfide gas. Provide sufficient ventilation in the affected area(s) and wear appropriate personal protective equipment as indicated in Section 8 when handling spill material.

Environmental Precautions:

Stop the leak if it can be done without risk. Prevent spilled material from entering waterways, sewers, basements or confined areas. Contain release to prevent further contamination of soils, surface water or groundwater. Clean up spill as soon as possible using appropriate techniques such as applying non-combustible absorbent materials or vacuuming. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean nonsparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil.

Methods for Containment and Clean Up:

Immediate cleanup of any spill is recommended. Build dike or use other appropriate spill response methods far ahead of spill for containment and later recovery or disposal of spilled material. Absorb spill with inert material and place in suitable container for disposal. If spilled on water, remove with appropriate equipment such as skimmers, booms or absorbents. In case of soil contamination, remove contaminated soil for remediation or disposal in accordance with applicable regulations.

Reporting:

Report spills/releases as required, to appropriate local, state and federal authorities. US Coast Guard and Environmental Protection Agency regulations require immediate reporting of spills/release that could reach any waterway. Report spill/release to the National Response Center at (800) 424-8802. In case of accident or road spill, notify Chemtrec at (800) 424-9300.

7. Handling and Storage

Handle in accordance with good industrial hygiene and safety practices. These practices include, but are not limited to, avoiding unnecessary exposure and prompt removal of material from eyes, skin, and clothing. If needed, take first aid actions as indicated in Section 4.

Precautions for Safe Handling:

Handle as a flammable liquid. Keep away from heat, sparks and open flame. No smoking. Use only with adequate ventilation. May release or contain dangerous levels of H₂S. Use only with adequate ventilation. Wear appropriate personal protective equipment and use exposure controls as indicated in Section 8. Vent slowly to the atmosphere when opening. Avoid all contact with skin and eyes. Avoid breathing product dust or vapors. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Non-sparking tools should be used. Ground and bond all transfer and storage equipment to prevent static sparks and equip with self-closing valves, pressure vacuum bungs and flame arrestors. Review all operations which have the potential of generating and accumulating electrostatic charge and/or flammable atmosphere. Use appropriate mitigating procedures. Do not enter confined spaces without following proper entry procedures. Remove contaminated clothing immediately. Wash with soap and water after working with this product.

Scales, deposits and sludge from equipment associated with this product may have accumulation of Naturally Occurring Radioactive Materials (NORM). Equipment should be assessed for external gamma radiation.

Conditions for Safe Storage:

Keep away from flame, sparks, excessive temperatures and open flame. No smoking. Maintain vessels closed and clearly labeled. Empty vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose these vessels to sources of ignition. This material may contain or release H₂S. In a tank or other closed container, the vapor space above this material may accumulate hazardous concentrations of H₂S. Do not enter confined spaces without following proper entry procedures. Use appropriate containment to avoid environmental contamination.

Incompatibilities:

Keep away from strong oxidizers, ignition sources and heat.

8. Exposure Controls/Personal Protection

Components	CAS No.	Wt% ⁽¹⁾	Occupational Exposure Limits			Units
			OSHA ⁽¹⁾	ACGIH ⁽¹⁾	NIOSH ⁽²⁾	
Crude Oil (Petroleum)	8002-05-9	<1	500 ppm	N/A	350 mg/m ³	---
Benzene	71-43-2	<1	1 5 ^{STEL}	0.5 ⁽³⁾ 2.5 ^{STEL}	0.1 1 ^{STEL}	ppm
Hydrogen Sulfide	7783-06-4	<1	20 ^{Ceiling}	5 ^{STEL}	10 ^{Ceiling}	ppm

⁽¹⁾8-hour TWA unless otherwise specified.

⁽²⁾10-hour TWA unless otherwise specified.

⁽³⁾ ACGIH has established a Biological Exposure Index (BEI) for this substance.

N/A: Not Applicable

STEL: 15-minute Short Term Exposure Limit

Ceiling: Concentration not to be exceeded at any time

Engineering Controls:

Provide adequate general and local exhaust ventilation to: (1) Maintain airborne chemical concentrations below applicable exposure limits, (2) Prevent accumulation of flammable vapors and formation of explosive atmospheres, and (3) Prevent formation of oxygen deficient atmospheres, especially in confined spaces.

Eye Protection:

Safety glasses are required standard PPE. Face shields are required when working with pressurized lines. Wear chemical goggles when working with liquid natural gas.

Skin Protection:

Fire Resistant Clothing (FRC) is required standard PPE. Insulated clothing and/or gloves should be worn where liquid or expanding gas may be generated.

Respiratory Protection:

A NIOSH-approved respirator must be worn where controls do not maintain airborne concentrations below occupational exposure limits. Positive-pressure, Full-face, self-contained breathing apparatus (SCBA) should be available for emergency use. H₂S MAY BE PRESENT OR RELEASED. NIOSH-approved respiratory protection should be used when handling crude of high or unknown hydrogen sulfide content and to reduce airborne concentrations to allowable occupational exposure levels.

Work/Hygiene Practices:

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties
Flammable Properties:

Flash Point: Varies widely depending on hydrocarbon content

Flammable Limits in Air, % by Volume:

Lower (LFL): 4.0 % Upper(UFL): 46.0 %

Auto-ignition Temperature: Not available

Values given are typical of similar products. There are no test results for this mixture.

Appearance:	Clear or opaque liquid	% Volatile by Volume:	Negligible
Odor:	Slightly hydrocarbon/rotten eggs	Viscosity:	Not available
Boiling Point:	Varies widely depending on hydrocarbon content	Melting Point:	Not available
Freezing Point:	< 32 °F	Vapor Density (Air = 1):	> 1
Vapor Pressure:	Not available	pH:	Not available
Solubility in H₂O:	Not available	Evaporation Rate:	Not available
Specific Gravity @ 68 °F & 1 atm:	> 1	Molecular Wt.:	Not available

10. Stability and Reactivity
Chemical Stability:

Stable under anticipated conditions of use and normal temperature conditions.

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Conditions to Avoid/Incompatibilities:

Strong oxidizing agents, strong reducing agents, chlorine, fluorine, bromine and metal catalysts, heat, sparks, flame and build-up of static electricity.

Hazardous Decomposition Products:

Not anticipated under normal conditions of use. Combustion of H₂S creates sulfur dioxide.

Hazardous Polymerization:

Not known to occur.

11. Toxicological Information

Toxicological data does not exist for this mixture.

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful poisonous hydrogen sulfide gas	May contain or release	>5 mg/L (mist, estimated)
Skin Absorption	Unlikely to be harmful		> 2 g/kg (estimated)
Ingestion (Swallowing)	Unlikely to be harmful		> 5 g/kg (estimated)

Aspiration Hazard: Not expected to be an aspiration hazard.

Skin Corrosion/Irritation: Not expected to be irritating.

Serious Eye Damage/Irritation: Not expected to be irritating.

Signs and Symptoms: No known effects of overexposure.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available on the mixture, however none of the components have been classified for respiratory sensitization (or are below the concentration threshold for classification).

Specific Target Organ Toxicity (Single Exposure): Not expected to cause organ effects from single exposure.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: May cause cancer.

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity.

Other Comments: This material may contain or liberate hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

Information on Toxicological Effects of Components

Crude Oil (Petroleum)

Carcinogenicity: Chronic application of crude oil to mouse skin resulted in an increased incidence of skin tumors. IARC concluded in its Crude Oil Monograph that there is limited evidence of carcinogenicity in animals, and that crude oil is not classifiable as to its carcinogenicity in humans (Group 3). It has not been listed as a carcinogen by NTP or OSHA.

Target Organs: Laboratory animal studies of crude oil by the dermal and inhalation exposure routes have demonstrated toxicity to the liver, blood, spleen and thymus.

Reproductive Toxicity: Dermal exposure to crude oil during pregnancy resulted in limited evidence of developmental toxicity in laboratory animals. Decreased fetal weight and increased resorptions were noted at maternally toxic doses. No significant effects on pup growth or other developmental landmarks were observed postnatally.

BENZENE: This product may contain benzene, which can cause degeneration in blood forming bone marrow leading to anemia which may further degrade to leukemia, a type of cancer. Acute benzene poisoning causes central nervous system depression. Chronic exposure affects the hematopoietic system causing blood disorders including anemia and pancytopenia. Mutagenic and clastogenic in mammalian and non-mammalian test systems. Reproductive or developmental toxicant only at doses that are maternally toxic, based on tests with animals.

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HYDROGEN SULFIDE: This product may contain or release hydrogen sulfide, which may be fatal if inhaled. Greater than 15-20 ppm continuous exposure can cause mucous membrane and respiratory tract irritation. 50-500 ppm can cause headache, nausea, dizziness, loss of reasoning and balance, difficulty breathing, fluid in the lungs and possible loss of consciousness. Greater than 500 ppm can cause rapid or immediate unconsciousness due to respiratory paralysis and death by suffocation unless removed from exposure and successfully resuscitated. Inhalation of a single breath at a concentration of 1000 ppm (0.1%) can cause immediate unconsciousness and death. Hydrogen sulfide is corrosive when moist. Skin contact may cause burns. There is a rapid loss of sense of smell on exposure to gas concentrations above 50 ppm. At high concentrations, individuals may not even recognize the odor before becoming unconscious.

Carcinogenicity:

Component (CAS No.)	ACGIH ⁽¹⁾	IARC Monographs ⁽²⁾	US NTP	OSHA Regulated
Benzene (71-43-2)	A1	1	Yes	Yes

⁽¹⁾ACGIH Carcinogens: A1 = Confirmed human carcinogen, A2 = Suspected human carcinogen, A3 = Confirmed animal carcinogen with unknown relevance to humans, A4 = Not classifiable as a human carcinogen, A5 = Not suspected as a human carcinogen

⁽²⁾IARC Monographs: 1 = Carcinogenic to humans, 2A = Probably carcinogenic to humans, 2B = Possibly carcinogenic to humans, 3 = Not classifiable as to carcinogenicity to humans, 4 = Probably not carcinogenic to humans

12. Ecological Information

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations. May be hazardous to waterways/wildlife.

13. Disposal Information

Do not dispose of waste into sewer. Do not allow this material to drain into sewers/water supplies. If discarded, this material may meet the criteria of being an "ignitable" waste. If hydrogen sulfide and/or benzene are present in the waste, the waste may be considered a hazardous U-listed waste. Under RCRA, it is the responsibility of the user to determine, at the time of disposal, if the material meets federal, state, or local criteria to be defined as a hazardous waste.

14. Transport Information

UN/Identification No: UN 1993
Proper Shipping Name: Flammable Liquid, n.o.s
Hazard Class: 3
Packing Group: II
ERG#: 128

15. Regulatory Information

Section 302 EPCRA Extremely Hazardous Substances (EHS):

Product Component	CAS No.	Wt%	RQ, lb	TPQ, lb
None				

Section 304 CERCLA Hazardous Substances:

Product Component	CAS No.	Wt%	RQ, lb
Benzene	71-43-2	<1	10
Hydrogen Sulfide	7783-06-4	<1	100

Section 311/312 Hazard Categorization:

Acute:	Chronic:	Fire:	Pressure:	Reactive:
Yes	Yes	Yes	Yes	No

Section 313 EPCRA Toxic Substances:

Ingredient	CAS No.	Wt. %
Benzene	71-43-2	<1
Hydrogen Sulfide	7783-06-4	<1

EPA TSCA

All components are either on the U.S. EPA TSCA Inventory List, or are not regulated under TSCA.

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Key RQ = Reportable Quantity
TPQ = Threshold Planning Quantity of EHS

CALIFORNIA PROPOSITION 65 WARNING

Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm may be found in crude oil and petroleum products. Although it is possible to sufficiently refine a crude oil or its end products to remove the potential for cancer, we are advising that one or more of the listed chemicals may be present in some detectable quantities. Read and follow directions and use care when handling crude oil and petroleum products.

16. Other Information

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THIS INFORMATION RELATES ONLY TO THE SPECIFIC MATERIAL DESIGNATED AND MAY NOT BE VALID FOR SUCH MATERIAL USED IN COMBINATION WITH ANY OTHER MATERIALS OR IN ANY PROCESS. SUCH INFORMATION IS TO THE BEST OF THIS COMPANY'S KNOWLEDGE AND BELIEVED ACCURATE AND RELIABLE AS OF THE DATE INDICATED. HOWEVER, NO REPRESENTATION, WARRANTY OR GUARANTEE IS MADE AS TO THE ACCURACY, RELIABILITY OR COMPLETENESS. IT IS THE USER'S RESPONSIBILITY TO SATISFY THEMSELVES AS TO THE SUITABILITY AND COMPLETENESS OF SUCH INFORMATION FOR THEIR OWN PARTICULAR USE.

Key/Legend:

ACGIH - American Conference of Governmental Industrial Hygienists
ADR - Agreement on Dangerous Goods by Road
CAA - Clean Air Act
CAS - Chemical Abstracts Service Registry Number
CDG - Carriage of Dangerous Goods By Road and Rail Manual
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CFR - Code of Federal Regulations
CNS - Central Nervous System
EINECS - European Inventory of Existing Chemical Substances Registry Number
ERG - Emergency Response Guidebook
EPCRA - Emergency Planning and Community Right-to-Know Act
GHS - Globally Harmonized System of Classification and Labeling of Chemicals
IARC - International Agency for Research on Cancer
IATA - International Air Transport Association
ICAO - International Civil Aviation Organization
IMDG - International Maritime Dangerous Goods Code
IMO - International Maritime Organization
MSDS - Material Safety Data Sheet
N/E - Not Established
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit
PPE - Personal Protective Equipment
RCRA - Resource Conservation and Recovery Act
RID - Regulations Concerning the International Transport of Dangerous Goods by Rail
RQ - Reportable Quantities
SARA - Superfund Amendments and Reauthorization Act of 1986
SDS - Safety Data Sheet
TCC - Tag Closed Cup
TDG - Transportation of Dangerous Goods
TLV - Threshold Limit Value
TSCA - Toxic Substance Control Act
UN/NA - United Nations / North American Number
UNECE - United Nations Economic Commission for Europe
US DOT - United States Department of Transportation
US EPA - United States Environmental Protection Agency
Vol. - Volume
WHMIS - Workplace Hazardous Materials Information System

This is the end of MSDS A0133.sds