1. Product and Company Identification

Material name: Produced water (sweet)
Version #: 01
Revision date: 04-27-2010
CAS #: Mixture
Synonym(s): Crude Oil Separated Water, Salt Water Brine, Salt Water, Formation Water
Manufacturer/Supplier: Devon US Operations
20 North Broadway
Oklahoma City, OK  73102-8260
Telephone: (405) 235-3611

Devon Canadian Operations
Calgary, AB. T2P 4H2
2000, 400 – 3rd Avenue SW.
Telephone: (403) 232-7100

Emergency: Emergency Chemtrec:
Within the USA (800) 424-9300
Outside the USA (703) 527-3887
Devon Canada Emergency Phone: (403) 232-7100

2. Hazards Identification

Physical state: Liquid.
Appearance: Dirty colored liquid with a faint hydrocarbon odor.

Emergency overview: WARNING! Causes eye irritation.
This product may contain a small amount of hydrocarbons with a trace amount of benzene which may cause cancer and heritable genetic damage.

OSHA regulatory status: This preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments. This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

Potential health effects:

Routes of exposure: Eye contact. Skin contact. Ingestion. Inhalation.

Eyes: Causes eye irritation.
Skin: Prolonged or repeated skin contact may cause irritation. Human and animal studies show that benzene is absorbed through the skin. However, absorption through the skin is normally low because benzene evaporates rapidly. In most cases, any skin contact would also involve significant inhalation exposure.

Inhalation: No inhalation hazard under normal conditions. If misting occurs: may cause mild mucous membrane irritation of the nose, throat, and upper respiratory tract. Produced water may contain benzene which may cause cancer and cause blood disorders.

Ingestion: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. The product may contain benzene which may cause cancer and cause blood disorders.

Chronic effects: Contains benzene. Human epidemiology studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-producing system and serious blood disorders, including leukemia. Animal tests suggest that prolonged and/or repeated overexposure to benzene may damage the embryo/fetus. The relevance of these animal studies to humans has not been fully established.

Potential environmental effects: Not expected to be harmful to aquatic organisms.

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>80-95</td>
</tr>
<tr>
<td>Calcium chloride</td>
<td>10043-52-4</td>
<td>0-20</td>
</tr>
<tr>
<td>Potassium Chloide</td>
<td>7447-40-7</td>
<td>0-20</td>
</tr>
</tbody>
</table>
Composition comments: May contain small amounts of condensate or crude oil as a contaminate. All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First Aid Measures

First aid procedures

- **Eye contact**: In case of contact, immediately flush eyes with fresh water for at least 15 minutes while holding the eyelids open. Remove contact lenses if worn. Get medical attention if irritation persists.
- **Skin contact**: Remove contaminated clothing and shoes. Wash affected area with mild soap and water. Get medical attention if irritation develops and persists.
- **Inhalation**: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.
- **Ingestion**: Rinse mouth thoroughly. Get medical attention if any discomfort occurs.

General advice:

- If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire Fighting Measures

Flammable properties: This product is not flammable; however sufficient hydrocarbon vapors may accumulate from oil or natural gas condensate floating on the surface of the produced water to cause a flash fire. The fire should burn out fairly rapidly depending on the amount of oil and natural gas condensate floating on the surface of the produced water.

Extinguishing media

- Suitable extinguishing media: Dry chemical powder. Foam. Carbon dioxide (CO2).

Protection of firefighters

- Protective equipment and precautions for firefighters: A fire would be associated with vapors related to oil or natural gas condensate floating on the surface of the produced water. Water maybe ineffective on flames and may even spread the fire but should be used to cool pressurized containers in the fire.
- Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with full face-piece operated in positive pressure mode. Use approved gas detectors in confined spaces.

Specific methods

- Promptly isolate the scene by removing persons from the vicinity of the incident if there is a fire. Do not extinguish flames at leak because of the possibility of a uncontrolled re-ignition exists. If it is safe to do so, cut off fuel supply and/or allow fire to burn out. The fire should burn out fairly rapidly depending on the amount of oil and natural gas condensate floating on the surface of the produced water. If leak or spill has not ignited, water spray or ventilation can be used to disperse the vapors.

Hazardous combustion products: Sodium oxides. Carbon oxides.

6. Accidental Release Measures

Personal precautions

- Keep away from sources of ignition - No smoking. The vapors should dissipate fairly rapidly depend on the amount of oil and natural gas condensate floating on the surface of the produced water. Stay upwind. Keep unnecessary personnel away. See Section 8 of the MSDS for Personal Protective Equipment.

Environmental precautions

- Prevent further leakage or spillage if safe to do so. Do not allow to enter drains, sewers or watercourses.

Methods for containment

- Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Prevent entry into waterways, sewer, basements or confined areas.

Methods for cleaning up

- Recover by pumping (use an explosion-proof motor or hand pump) or by sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Where feasible and appropriate, remove contaminated soil or flush with fresh water. On water spills utilize absorbent material to remove oil and natural gas liquid from the surface of the water.

Other information

- Avoid excess skin contact with spilled material.
7. Handling and Storage

Handling
Handle as a flammable liquid. Tank headspaces should always be regarded as potentially flammable and care should be taken to avoid static electrical discharge and all ignition sources during filling, discharging and sampling from storage tanks. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion. Keep away form heat, sparks, and open flame. Electrical equipment should be approved for classified area. Wear appropriate personal protective equipment (see section 8). Special precautions should be taken when entering or handling equipment in this type of produced water service because of possible radioactive contamination. All equipment should be checked for radioactivity or opened to the atmosphere and have forced ventilation applied for at least 4 hours prior to entry or handling. Avoid direct skin contact with any surface. Avoid generation of dust, smoke, fumes, etc. in the work area, or if they cannot be avoided, a tested and certified radionuclide dust respirator should be worn. Smoking, eating or drinking should be prohibited when working with the equipment. Workers should wash thoroughly with soap and water and discard contaminated clothing after entering or handling the equipment. Workers should wash hands and face before eating, drinking and smoking.

Storage
Keep containers in well-ventilated area away from flame, sparks, excessive temperatures and open flames. Keep the containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. Do not enter storage areas and confined spaces without adequate ventilation. Use appropriate respiratory protection if there is the potential to exceed the exposure limit(s). Vapors containing benzene may accumulate during storage and transport.

8. Exposure Controls / Personal Protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>ACGIH Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (71-43-2)</td>
<td>STEL</td>
<td>2.5 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.5 ppm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>U.S. - OSHA Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (71-43-2)</td>
<td>Ceiling</td>
<td>25 ppm</td>
</tr>
<tr>
<td></td>
<td>STEL</td>
<td>5 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>1 ppm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Canada - Alberta Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (71-43-2)</td>
<td>STEL</td>
<td>8 mg/m3</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>2.5 ppm</td>
</tr>
<tr>
<td>Calcium chloride (10043-52-4)</td>
<td></td>
<td>1.6 mg/m3</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.5 ppm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Canada - British Columbia Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (71-43-2)</td>
<td>STEL</td>
<td>2.5 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.5 ppm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Canada - Ontario Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (71-43-2)</td>
<td>STEL</td>
<td>2.5 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.5 ppm</td>
</tr>
<tr>
<td>Calcium chloride (10043-52-4)</td>
<td></td>
<td>5 mg/m3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Canada - Quebec Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene (71-43-2)</td>
<td>STEL</td>
<td>15.5 mg/m3</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>5 ppm</td>
</tr>
</tbody>
</table>

| Engineering controls | |
|---------------------| |
| Ensure adequate ventilation, especially in confined areas. |

| Personal protective equipment Eye / face protection | |
|------------------------------------------------------| |
| If eye contact is likely, safety glasses with side shields or chemical type goggles should be worn. |
Skin protection
No special garments required. Wash contaminated clothing prior to reuse. Avoid unnecessary skin contamination with material. Use of chemical resistant gloves is advised to prevent skin contact.

Respiratory protection
No personal respiratory protective equipment normally required.

General hygiene considerations
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. Discard contaminated clothing and footwear that cannot be cleaned. Handle in accordance with good industrial hygiene and safety practice.

9. Physical & Chemical Properties

Appearance
Dirty colored liquid with a faint hydrocarbon odor.

Color
Varies from clear to dark brown.

Odor
Faint. Hydrocarbon-like.

Odor threshold
Not available.

Physical state
Liquid.

Form
Liquid.

pH
4.9 - 8.5

Melting point
Not available.

Freezing point
< 32 °F (< 0 °C)

Boiling point
212 °F (100 °C) Approx.

Flash point
Variable organic oil and dissolved gases are flammable.

Evaporation rate
0.36

Flammability
Not available.

Flammability limits in air, upper, % by volume
Not available.

Flammability limits in air, lower, % by volume
Not available.

Vapor pressure
13.6 mm Hg @ 68°F (20°C)

Vapor density
< 1

Specific gravity
1.1 @ 68°F (20°C)

Solubility (water)
Complete

Partition coefficient (n-octanol/water)
Not available.

Auto-ignition temperature
Not available.

Decomposition temperature
Not available.

10. Chemical Stability & Reactivity Information

Chemical stability
Stable.

Conditions to avoid
Keep away from heat, sparks and open flame.

Hazardous decomposition products
Carbon Dioxide. Water vapor. May produce oxides of sulfur. Incomplete combustion may generate carbon monoxide.

Possibility of hazardous reactions
Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

<table>
<thead>
<tr>
<th>Components</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium chloride</td>
<td>Acute Oral LD50 Rat: 1000 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Acute Other LD50 Mouse: 42 mg/kg</td>
</tr>
<tr>
<td>Benzene</td>
<td>Acute Inhalation LC50 Mouse: 9980 mg/l</td>
</tr>
<tr>
<td></td>
<td>Acute Inhalation LC50 Rat: 10000 mg/l 7 Hours</td>
</tr>
<tr>
<td></td>
<td>Acute Oral LD50 Mouse: 4700 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Acute Oral LD50 Rat: 3306 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Acute Other LD50 Mouse: 340 mg/kg</td>
</tr>
</tbody>
</table>
Components Test Results

Benzene (71-43-2)  
Acute Other LD50 Mouse: 0.000001 ml/kg  
Acute Other LD50 Rat: 2.89 mg/kg  
Potassium Chloide (7447-40-7)  
Acute Oral LD50 Rat: 2600 mg/kg

Toxicological information

This product may contain detectable but varying quantities of the naturally occurring radioactive substance radon 222. The amount in the gas itself is not hazardous, but since radon rapidly decays (t1/2 = 3.82 days) to form other radioactive elements including lead 210, polonium 210, and bismuth 210, equipment may be radioactive. The radon daughters are solids and therefore may attach to dust particles or form films and sludges in equipment. Inhalation, ingestion or skin contact with radon daughters can lead to the deposition of radioactive material in the lungs, bone, blood forming organs, intestinal tract, kidney and colon. Occupational exposure to radon and radon daughters has been associated with an increased risk of lung cancer in underground uranium miners. Follow the special precautions listed in handling and storage section of this document (see section 7).

Local effects  
Causes eye irritation. May cause skin irritation. May cause discomfort if swallowed.

Sensitization  
Not a skin sensitizer.

Chronic effects  
No additional adverse health effects noted.

Carcinogenicity  
This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens  
Benzene (CAS 71-43-2) A1 Confirmed human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity  
Benzene (CAS 71-43-2) 1 Carcinogenic to humans.

US NTP Report on Carcinogens: Known carcinogen  
Benzene (CAS 71-43-2) Known carcinogen.

US OSHA Specifically Regulated Substances: Cancer hazard  
Benzene (CAS 71-43-2) Cancer hazard.

Epidemiology  
No epidemiological data is available for this product.

Mutagenicity  
No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Neurological effects  
No data available.

Reproductive effects  
Contains no ingredient listed as toxic to reproduction.

Teratogenicity  
No known human teratogenic effect.

Further information  
This product has no known adverse effect on human health.

12. Ecological Information

Ecotoxicological data

Components Test Results

Calcium chloride (10043-52-4)  
EC50 Water flea (Daphnia magna): 52 mg/l 48 hours  
LC50 Fathead minnow (Pimephales promelas): 3930 - 5360 mg/l 96 hours

Benzene (71-43-2)  
EC50 Water flea (Daphnia magna): 8.76 - 15.6 mg/l 48 hours  
EC50 Water flea (Daphnia magna): 8.76 - 15.6 mg/l 48 Hours  
LC50 Rainbow trout, donaldson trout (Oncorhynchus mykiss): 5 mg/l 96 Hours

Potassium Chloride (7447-40-7)  
EC50 Water flea (Daphnia magna): 83 mg/l 48 hours  
LC50 Western mosquito fish (Gambusia affinis): 435 mg/l 96 hours

Sodium chloride (7647-14-5)  
EC50 Water flea (Daphnia magna): 340.7 - 469.2 mg/l 48 hours  
LC50 American eel (Anguilla rostrata): 0 - 27260 mg/l 96 hours

Ecotoxicity  
Not expected to be harmful to aquatic organisms.

Environmental effects  
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Persistence and degradability  
None known.
Bioaccumulation / Accumulation
No data available.

Partition coefficient (n-octanol/water)
Not available.

Mobility in environmental media
No data available.

13. Disposal Considerations

Disposal instructions
Do not allow this material to drain into sewers/water supplies. This product, in its present state, when discarded or disposed of, is not a hazardous waste according to Federal regulations (40 CFR 261.4 (b)(4)). Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.

Waste from residues / unused products
Not applicable.

Contaminated packaging
Offer rinsed packaging material to local recycling facilities.

14. Transport Information

DOT
Not regulated as dangerous goods.

IATA
Not regulated as dangerous goods.

IMDG
Not regulated as dangerous goods.

TDG
Not regulated as dangerous goods.

15. Regulatory Information

US federal regulations
This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration
Benzene (CAS 71-43-2) 0.1 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance
Benzene (CAS 71-43-2) Listed.

CERCLA (Superfund) reportable quantity (lbs)
Benzene 10

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

Section 302 extremely hazardous substance
No

Section 311 hazardous chemical
No

Drug Enforcement Agency (DEA)
Not controlled

WHMIS status
Controlled

WHMIS classification
D2B - Other Toxic Effects-TOXIC

WHMIS labeling

State regulations
This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.
US - California Hazardous Substances (Director's): Listed substance
Benzene (CAS 71-43-2) Listed.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance
Benzene (CAS 71-43-2) Listed.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance
Benzene (CAS 71-43-2) Listed: February 27, 1987 Carcinogenic.

US - California Proposition 65 - CRT: Listed date/Developmental toxin
Benzene (CAS 71-43-2) Listed: December 26, 1997 Developmental toxin.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin
Benzene (CAS 71-43-2) Listed: December 26, 1997 Male reproductive toxin.

US - Massachusetts RTK - Substance: Listed substance
Benzene (CAS 71-43-2) Listed.

US - New Jersey Community RTK (EHS Survey): Reportable threshold
Benzene (CAS 71-43-2) 500 LBS

US - New Jersey RTK - Substances: Listed substance
Benzene (CAS 71-43-2) Listed.

US - Pennsylvania RTK - Hazardous Substances: Listed substance
Benzene (CAS 71-43-2) Listed.

US - Pennsylvania RTK - Hazardous Substances: Special hazard
Benzene (CAS 71-43-2) Special hazard.

16. Other Information

Further information
HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings
Health: 1
Flammability: 1
Physical hazard: 0

NFPA ratings
Health: 1
Flammability: 1
Instability: 0

Disclaimer
The information in the sheet was written based on the best knowledge and experience currently available.

Issue date
04-27-2010