1. Product and Company Identification

<table>
<thead>
<tr>
<th>Material name</th>
<th>Produced water (sour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version #</td>
<td>01</td>
</tr>
<tr>
<td>Revision date</td>
<td>06-02-2010</td>
</tr>
<tr>
<td>CAS #</td>
<td>Mixture</td>
</tr>
<tr>
<td>Synonym(s)</td>
<td>Crude Oil Separated Water, Salt Water Brine, Salt Water, Formation Water</td>
</tr>
<tr>
<td>Manufacturer/Supplier</td>
<td>Devon US Operations</td>
</tr>
<tr>
<td></td>
<td>20 North Broadway</td>
</tr>
<tr>
<td></td>
<td>Oklahoma City, OK 73102-8260</td>
</tr>
<tr>
<td></td>
<td>Telephone: (405) 235-3611</td>
</tr>
<tr>
<td></td>
<td>Devon Canadian Operations</td>
</tr>
<tr>
<td></td>
<td>Calgary, AB T2P 4H2</td>
</tr>
<tr>
<td></td>
<td>2000, 400 – 3rd Avenue SW.</td>
</tr>
<tr>
<td></td>
<td>Telephone: (403) 232-7100</td>
</tr>
<tr>
<td>Emergency</td>
<td>Emergency Chemtrec:</td>
</tr>
<tr>
<td></td>
<td>Within the USA (800) 424-9300</td>
</tr>
<tr>
<td></td>
<td>Outside the USA (703) 527-3887</td>
</tr>
<tr>
<td></td>
<td>Devon Canada Emergency Phone: (403) 232-7100</td>
</tr>
</tbody>
</table>

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. Hydrogen sulfide, a highly toxic gas, is present. Signs and symptoms of overexposure to hydrogen sulfide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. |
| 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>
</tbody>
</table>
Composition comments
May contain small amounts of condensate or crude oil as a contaminant. 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 may be 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 from 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. Trace amounts of hydrogen sulfide, a very highly toxic gas, may be present with this material. Keep face clear of tank and/or tank car openings.

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>
<tr>
<td>Hydrogen sulfide (7783-06-4)</td>
<td>STEL</td>
<td>15 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>10 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>
<tr>
<td>Hydrogen sulfide (7783-06-4)</td>
<td>Ceiling</td>
<td>20 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></td>
<td></td>
<td>0.5 ppm</td>
</tr>
<tr>
<td>Hydrogen sulfide (7783-06-4)</td>
<td>Ceiling</td>
<td>15 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>21 mg/m3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14 mg/m3</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>
<tr>
<td>Hydrogen sulfide (7783-06-4)</td>
<td>Ceiling</td>
<td>10 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
Wear approved respiratory protection when working with this material unless ventilation is
adequate to keep airborne concentrations below recommended exposure standards. Note: If any
of the applicable hydrogen sulfide standards are likely to be exceeded, positive supplied-air
respiratory protection must be used. The ACGIH TWA for hydrogen sulfide is 10 ppm. The OSHA
STEL is 15 ppm.

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

Possibility of hazardous
reactions
Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Components
Test Results
Calcium chloride (10043-52-4)
Acute Oral LD50 Rat: 1000 mg/kg
Acute Other LD50 Mouse: 42 mg/kg

Benzene (71-43-2)
Acute Inhalation LC50 Mouse: 9980 mg/l
Acute Inhalation LC50 Rat: 10000 mg/l 7 Hours

Produced water (sour)
### Components Test Results

<table>
<thead>
<tr>
<th>Component</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benzene (71-43-2)</strong></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>
<tr>
<td></td>
<td>Acute Other LD50 Mouse: 0.000001 ml/kg</td>
</tr>
<tr>
<td></td>
<td>Acute Other LD50 Rat: 2.89 mg/kg</td>
</tr>
<tr>
<td><strong>Potassium Chloride (7447-40-7)</strong></td>
<td>Acute Oral LD50 Rat: 2600 mg/kg</td>
</tr>
<tr>
<td><strong>Hydrogen sulfide (7783-06-4)</strong></td>
<td>Acute Inhalation LC50 Mouse: &gt; 0.024 mg/l 960 Minutes</td>
</tr>
<tr>
<td></td>
<td>Acute Inhalation LC50 Rat: &gt; 0.38 mg/l 960 Minutes</td>
</tr>
</tbody>
</table>

### 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 (1/2 = 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

<table>
<thead>
<tr>
<th>Components</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calcium chloride (10043-52-4)</strong></td>
<td>EC50 Water flea (Daphnia magna): 52 mg/l 48 hours</td>
</tr>
<tr>
<td></td>
<td>LC50 Fathead minnow (Pimephales promelas): 3930 - 5360 mg/l 96 hours</td>
</tr>
<tr>
<td><strong>Benzene (71-43-2)</strong></td>
<td>EC50 Water flea (Daphnia magna): 8.76 - 15.6 mg/l 48 hours</td>
</tr>
<tr>
<td></td>
<td>EC50 Water flea (Daphnia magna): 8.76 - 15.6 mg/l 48 Hours</td>
</tr>
<tr>
<td></td>
<td>LC50 Rainbow trout,donaldson trout (Oncorhynchus mykiss): 5 mg/l 96 Hours</td>
</tr>
<tr>
<td><strong>Potassium Chloride (7447-40-7)</strong></td>
<td>EC50 Water flea (Daphnia magna): 83 mg/l 48 hours</td>
</tr>
<tr>
<td></td>
<td>LC50 Western mosquitofish (Gambusia affinis): 435 mg/l 96 hours</td>
</tr>
</tbody>
</table>
Components Test Results

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

Hydrogen sulfide (7783-06-4) LC50 Lake whitefish (Coregonus clupeaformis): 0.002 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. All components are on the U.S. EPA TSCA Inventory List.

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Spill: Reportable quantity
Hydrogen sulfide (CAS 7783-06-4) 100 LBS

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity
Hydrogen sulfide (CAS 7783-06-4) 500 LBS

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
Hydrogen sulfide 100
### 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.
- Hydrogen sulfide (CAS 7783-06-4) 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**

**US - California Proposition 65 - CRT: Listed date/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.
- Hydrogen sulfide (CAS 7783-06-4) Listed.

**US - New Jersey Community RTK (EHS Survey): Reportable threshold**
- Benzene (CAS 71-43-2) 500 LBS
- Hydrogen sulfide (CAS 7783-06-4) 500 LBS

**US - New Jersey RTK - Substances: Listed substance**
- Benzene (CAS 71-43-2) Listed.
- Hydrogen sulfide (CAS 7783-06-4) Listed.

**US - Pennsylvania RTK - Hazardous Substances: Listed substance**
- Benzene (CAS 71-43-2) Listed.
- Hydrogen sulfide (CAS 7783-06-4) 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: 2
- Flammability: 1
- Physical hazard: 0

**NFPA ratings**
- Health: 2
- Flammability: 1
- Instability: 0

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

**Issue date**
06-02-2010