1. Product and Company Identification

Material name: Bitumen

Version #: 01

Revision date: 06-02-2010

Product use: Feed Stock.

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: Solid.

Appearance: Tarry texture.

Emergency overview: CAUTION

At elevated temperatures may cause irritation of the eyes and respiratory tract. 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 product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

Potential health effects:
- Eyes: At elevated temperatures, vapor may cause irritation of eyes. Contact with hot material can cause thermal burns which may result in permanent damage.
- Skin: Contact with hot material can cause thermal burns which may result in permanent damage.
- Inhalation: Inhalation of vapors/fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or difficulty breathing.
- Ingestion: Direct contact with hot material can cause thermal burns. Asphalt has low systemic toxicity when ingested. However, chewing asphalt has caused gastrointestinal effects. Gastric masses (Bezoars) and stomach (pyloric) obstructions have been reported in individuals who have chewed and swallowed asphalt.
- Chronic effects: Exposure to Asphalt fumes can cause severe irritation of the skin and may cause dermatitis and acne-like lesions. Prolonged contact may cause skin pigment change which may be aggravated by sunlight exposure.
- Signs and symptoms: Symptoms of exposure to fumes from heated material may include: Irritation of nose and throat. Coughing. Shortness of breath. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

Potential environmental effects: The product components are 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.

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to hydrogen ratio. It also contains small amount of various metals such as nickel, iron, and vanadium</td>
<td>8052-42-4</td>
<td>95-100</td>
</tr>
</tbody>
</table>
Composition comments

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
If hot product contacts eye, flush with water for at least 15 minutes and seek medical attention immediately.

Skin contact
In case of contact with hot or molten product, cool rapidly with water and seek immediate medical attention. Do not attempt to remove molten product from skin because skin will tear easily.

Inhalation
If fumes from heated product are inhaled: Move into fresh air and keep at rest. If breathing is difficult, give oxygen. Get medical attention if symptoms occur.

Ingestion
Not likely, due to the form of the product.

Notes to physician
Skin exposure to asphalts can cause workers to experience photosensitization, a condition where the exposed area of skin becomes very sensitive to sunlight, and other sources of ultraviolet (UV) light. Without exposure to UV, sensitive skin may appear to be sunburned. With exposure to UV, the skin may blister and develop sores. Provide general supportive measures and treat symptomatically. Symptoms may be delayed.

General advice
Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire Fighting Measures

Flammable properties
The product is non-combustible. If heated, toxic vapors may be formed.

Extinguishing media

Suitable extinguishing media
Extinguish with foam, carbon dioxide, dry powder or water fog.

Unsuitable extinguishing media
Do not use water jet as an extinguisher, as this will spread the fire.

Protection of firefighters
Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

Specific methods
Water spray should be used to cool containers.

Hazardous combustion products

6. Accidental Release Measures

Personal precautions
Avoid inhalation of fumes from molten product. Avoid contact with hot material. Keep unnecessary personnel away. Ventilate closed spaces before entering. Wear suitable protective clothing, gloves and eye/face protection. For personal protection, see section 8 of the MSDS.

Environmental precautions
Stop leak if possible without any risk. Contact local authorities in case of spillage to drain/aquatic environment.

Methods for containment
Prevent entry into waterways, sewers, basements or confined areas.

Methods for cleaning up
Sweep up or gather material and place in appropriate container for disposal. Heated material: Let it solidify. Contain spillage with sand or earth and remove to a safe place after it has solidified. Containers with collected spillage must be properly labeled with correct contents and hazard symbol. Collect and dispose of spillage as indicated in section 13 of the MSDS.

Other information
Clean up in accordance with all applicable regulations.

7. Handling and Storage

Handling
The intended use of this product does not include its cutting, grinding and crushing. Use only with adequate ventilation. Avoid inhalation of fumes from molten product. Avoid contact with molten material. Wear personal protective equipment. Observe good industrial hygiene practices.

Storage
Keep container tightly closed. Keep container in a well-ventilated place. Outside or detached storage preferred. Vapors containing hydrogen sulfide may accumulate during storage or transport of asphaltic materials. Store away from incompatible materials.
8. Exposure Controls / Personal Protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>ACGIH Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to-hydrogen ratios. It also contains small amount of various metals such as nickel, iron, and vanadium (8052-42-4)</td>
<td>TWA</td>
<td>0.5 mg/m3</td>
<td>Inhalable fraction.</td>
</tr>
<tr>
<td>Hydrogen sulfide (7783-06-4)</td>
<td>STEL</td>
<td>15 ppm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>10 ppm</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>U.S. - OSHA Components</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<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>A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to-hydrogen ratios. It also contains small amount of various metals such as nickel, iron, and vanadium (8052-42-4)</td>
<td>TWA</td>
<td>5 mg/m3</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>TWA</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</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>A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to-hydrogen ratios. It also contains small amount of various metals such as nickel, iron, and vanadium (8052-42-4)</td>
<td>TWA</td>
<td>0.5 mg/m3</td>
</tr>
<tr>
<td>Hydrogen sulfide (7783-06-4)</td>
<td>Ceiling</td>
<td>10 ppm</td>
</tr>
</tbody>
</table>

Engineering controls
Adequate ventilation should be provided whenever the material is heated or mists are generated. Observe Occupational Exposure Limits and minimize the risk of inhalation.

Personal protective equipment

Eye / face protection
Heated material: Wear safety glasses with side shields (or goggles). Cold material: Wear approved safety goggles.

Skin protection
When material is heated, wear gloves to protect against thermal burns. Thermally protective, chemical resistant full body suit is recommended when volume of material is significant.

Respiratory protection
Wear approved respiratory protection when working with this material unless ventilation or other engineering controls are adequate to keep airborne concentrations below recommended exposure standards. Follow respirator protection program requirements (OSHA 1910.134 or CSA-Z94.4-02(R2008), and ANSI / AIHA Z88.6) for all respirator use. Note: If any of the applicable hydrogen sulfide standards are likely to be exceeded, positive pressure supplied-air respiratory protection must be used.

General hygiene considerations
Avoid contact with eyes. 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 & Chemical Properties

Appearance
Tarry texture.

Color
Brown/black.

Odor
Solvent-like.

Odor threshold
Not available.

Physical state
Solid.

Form
Viscous liquid.

pH
Not available.

Melting point
Not available.
Freezing point Not available.
Boiling point > 334.4 °F (> 168 °C)
Flash point > 212 °F (> 100 °C)
Evaporation rate Not available.
Flammability Not available.
Flammability limits in air, upper, % by volume Not available.
Flammability limits in air, lower, % by volume Not available.
Vapor pressure Not available.
Vapor density Not available.
Specific gravity 1.024 (20°C/ 68°F)
Solubility (water) Insoluble in water.
Partition coefficient (n-octanol/water) Not available.
Auto-ignition temperature Not available.
Decomposition temperature Not available.

10. Chemical Stability & Reactivity Information
Chemical stability Stable at normal conditions.
Conditions to avoid Incompatible materials.
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>Hydrogen sulfide (7783-06-4)</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>
<tr>
<td>A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to hydrogen ratios. It also contains small amount of various metals such as nickel, iron, and vanadium (8052-42-4)</td>
<td>Acute Dermal LD50 Rabbit: &gt;= 2000 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Acute Oral LD50 Rat: &gt;= 5000 mg/kg</td>
</tr>
</tbody>
</table>

Acute effects At elevated temperatures, vapor may cause irritation of eyes and respiratory tract. Hydrogen sulfide, a highly toxic gas, may be 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.

Local effects Contact with hot material can cause thermal burns which may result in permanent damage. Inhalation of vapors/fumes generated by heating this product may cause respiratory irritation with throat discomfort, coughing or difficulty breathing. Dust from grinding of asphalt or fumes from the heating of this material caused transitory inflammation and irritation of the surface of the eyes and of the respiratory passages, as well as limbal pigmentation of cornea.

Sensitization Not a skin sensitizers.

Chronic effects Exposure to Asphalt fumes can cause severe irritation of the skin and may cause dermatitis and acne-like lesions. Prolonged contact may cause skin pigment change which may be aggravated by sunlight exposure.
Carcinogenicity

**ACGIH Carcinogens**

A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to hydrogen ratios. It also contains small amount of various metals such as nickel, iron, and vanadium (CAS 8052-42-4)

**A4 Not classifiable as a human carcinogen.**

**Epidemiology**

Not available.

**Mutagenicity**

Not available.

**Neurological effects**

Not available.

**Reproductive effects**

Not available.

**Teratogenicity**

Not available.

**Further information**

Asphalt has low systemic toxicity when ingested. However, chewing asphalt has caused gastrointestinal effects. Gastric masses (Bezoars) and stomach (pyloric) obstructions have been reported in individuals who have chewed and swallowed asphalt. Effects on the tracheobronchial tree and lungs of mice inhaling an aerosol of petroleum asphalt & another group inhaling smoke from heated petroleum asphalt incl. congestion, acute bronchitis, pneumonitis, bronchial dilation, some perbrachiolar round cell infiltration, abscess formation, loss of cilia, epithelial atrophy & necrosis.

12. Ecological Information

**Ecotoxicological data**

**Components**

| Hydrogen sulfide (7783-06-4) | Test Results LC50 Lake whitefish (Coregonus clupeaformis): 0.002 mg/l 96 hours |

**Ecotoxicity**

The product components are 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.

**Environmental effects**

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

**Persistence and degradability**

No data available.

**Bioaccumulation / Accumulation**

No data available.

**Partition coefficient (n-octanol/water)**

Not available.

**Mobility in environmental media**

The product is insoluble in water.

13. Disposal Considerations

**Waste codes**

Not regulated.

**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.

14. Transport Information

**DOT**

**Basic shipping requirements:**

<table>
<thead>
<tr>
<th>UN number</th>
<th>UN3257</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper shipping name</td>
<td>Elevated temperature liquid, n.o.s.</td>
</tr>
<tr>
<td>Hazard class</td>
<td>9</td>
</tr>
<tr>
<td>Packing group</td>
<td>III</td>
</tr>
<tr>
<td>Environmental hazards</td>
<td></td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>No</td>
</tr>
<tr>
<td>Labels required</td>
<td>9</td>
</tr>
</tbody>
</table>

**Additional information:**

- Special provisions: IB1, T3, TP3, TP29
- Packaging exceptions: None
- Packaging non bulk: None
- Packaging bulk: 247
ERG number 128

IATA
Basic shipping requirements:
UN number 3257
Proper shipping name Elevated temperature liquid, n.o.s.
Hazard class 9

IMDG
Basic shipping requirements:
UN number 3257
Proper shipping name ELEVATED TEMPERATURE LIQUID, N.O.S.
Hazard class 9
Packing group III
Environmental hazards
Marine pollutant No
EmS No. F-A, S-P*

TDG
Basic shipping requirements:
Proper shipping name ELEVATED TEMPERATURE LIQUID, N.O.S.
Hazard class 9
UN number UN3257
Packing group III
Marine pollutant Marine pollutant only when containing 10% or more substances identified as marine pollutants or severe marine pollutant when containing 1% or more substances identified as severe marine pollutants

15. Regulatory Information
US federal regulations
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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

CERCLA (Superfund) reportable quantity (lbs)
A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to hydrogen ratios. It also contains small amount of various metals such as nickel, iron, and vanadium 100
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 - Non-controlled

State regulations

**US - California Hazardous Substances (Director's): Listed substance**
Hydrogen sulfide (CAS 7783-06-4) Listed.

**US - Massachusetts RTK - Substance: Listed substance**
A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to-hydrogen ratios. It also contains small amount of various metals such as nickel, iron, and vanadium (CAS 8052-42-4)
Hydrogen sulfide (CAS 7783-06-4) Listed.

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

**US - New Jersey RTK - Substances: Listed substance**
A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to-hydrogen ratios. It also contains small amount of various metals such as nickel, iron, and vanadium (CAS 8052-42-4)
Hydrogen sulfide (CAS 7783-06-4) Listed.

**US - Pennsylvania RTK - Hazardous Substances: Listed substance**
A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to-hydrogen ratios. It also contains small amount of various metals such as nickel, iron, and vanadium (CAS 8052-42-4)
Hydrogen sulfide (CAS 7783-06-4) Listed.

**US - Pennsylvania RTK - Hazardous Substances: Special hazard**
A complex of high molecular weight organic compounds with carbon numbers greater than C16, with a high carbon-to-hydrogen ratios. It also contains small amount of various metals such as nickel, iron, and vanadium (CAS 8052-42-4)

**16. Other Information**

**Further information**
HMIS® is a registered trade and service mark of the NPCA. G - Safety Glasses, Gloves, Vapor Respirator

**HMIS® ratings**
- Health: 1
- Flammability: 0
- Physical hazard: 0
- Personal protection: G

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

**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.

**Issue date**
06-02-2010