Material Safety Data Sheet

J.P. Morgan Ventures Energy Corporation

MidGrade Coal Tar Oil

1. IDENTIFICATION

Product Name: MidGrade Coal Tar Oil
Synonyms: Brown Coal Tar, Tar Oil
Intended Use: Fuel Blending
Supplier: J.P. Morgan Ventures Energy Corporation
383 Madison Avenue, 10th Floor
New York, NY 10017

Chemical Family:
An oil distilled from brown-coal tar. Composed primarily of aliphatic, naphthenic and one-to-three-ring aromatic hydrocarbons, their alkyl derivates, heteroaromatics and one-and-two-ring phenols boiling in the range of approximately 150 °C to 360 °C

24 Hour Emergency Numbers:
Chemtrec: 800-424-9300
JPMorgan Technical Information: 212-834-5788
California Poison Control: 800-356-3219

2. HAZARD(S) IDENTIFICATION

Classification:
H227 Combustible liquid – Category 3
H304 May be fatal if swallowed and enters airways – Category 1
H318 Causes serious eye damage – Category 1
H335 May cause respiratory irritation – Category 3
H336 May cause drowsiness or dizziness – Category 3
H351 Suspected of causing cancer – Category 2
H373 May cause damage to organs through prolonged or repeated exposure Category 2
H411 Toxic to aquatic life with long lasting effects – Category 6

Label Elements:

Precautionary Statements:
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
P233 Keep container tightly closed
P240 Ground/bond container and receiving equipment
P241 Use explosion-proof electrical/ventilating/lighting equipment
P242 Use only non-sparking tools
P243 Take precautionary measures against static discharge
P261 Avoid breathing dust/fume/gas/mist/vapours/spray
P264 Wash thoroughly after handling
P271 Use only outdoors or in a well-ventilated area
P280 Wear protective gloves / protective clothing / eye protection / face protection
P361, P353 IF ON SKIN OR HAIR: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower
P305,P351,P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P313 If eye irritation persists, get medical advice/attention
P301,P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P331 Do NOT induce vomiting
P304,P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Material Safety Data Sheet

J.P. Morgan Ventures Energy Corporation
MidGrade Coal Tar Oil

2. HAZARD(S) IDENTIFICATION

P312 Call a POISON CENTER or doctor/physician if you feel unwell
P370,P378 In case of fire: Use dry chemical, carbon dioxide, or foam for extinction
P403 Store locked up
P405 Store in a well-ventilated place
P501 Dispose of contents/container to approved facility

3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components.</th>
<th>CASRN</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown Coal Tar</td>
<td>101316-83-0</td>
<td>100</td>
</tr>
<tr>
<td>C-9 to C-28 Alkanes/Alkenes</td>
<td>65996-93-2</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Acetone</td>
<td>67-64-1</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Biphenyl</td>
<td>92-52-4</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>2-Butanone</td>
<td>78-93-3</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Cresols, all isomers</td>
<td>1319-77-3</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>Ethyl Benzene</td>
<td>100-41-4</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Fluorene</td>
<td>86-73-7</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>Indene</td>
<td>95-13-6</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Methyl Pyridines</td>
<td></td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>Phenol</td>
<td>108-95-2</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>Polynuclear Aromatic Hydrocarbons (PAH) Mixture</td>
<td></td>
<td>&lt; 25</td>
</tr>
<tr>
<td>Pyridine</td>
<td>110-86-1</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>Xylene, all isomers</td>
<td>1330-20-7</td>
<td>&lt; 5</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Inhalation
Move the exposed person to fresh air at once. If not breathing, clear airways and give artificial respiration. If breathing is difficult, humidified oxygen should be administered by qualified personnel. Keep exposed person warm and at rest. If patient is conscious, the irritation of the throat may be relieved by water in the mouthy. Seek medical attention if breathing difficulties continue.

Eye
Flush eyes with water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of the eye. Remove contact lenses, if worn, after initial flushing. Do not use eye ointment. Seek medical attention.

Skin
Speedy action is of the utmost importance. Immediately remove contaminated shoes and clothing, flush affected areas with large amounts of water, wash affected area thoroughly for at least 15 minutes with mild soap and water, and seek medical assistance. If skin surface is damaged, apply a clean dressing and seek medical attention. Seek medical attention if tissue appears damaged or if pain or irritation persists. Launder or discard contaminated clothing.

Ingestion
Aspiration hazard. Do not induce vomiting or give anything by mouth because the material can enter the lungs and cause severe lung damage. Wash mouth out with water. If spontaneous vomiting is about to occur, place victim’s head below knees. If victim is drowsy or unconscious, place on the left side with head down. Do not leave victim unattended and observe closely for adequacy of breathing. If the patient is conscious and alert, provide water to drink. Seek medical attention.
4. FIRST AID MEASURES

**Most Important Symptom and Effects**

Eye and respiratory irritant, skin burns. Overexposure may result in serious health effects. Treatment must be given promptly. See section 11 for a more complete discussion of potential signs and symptoms.

**Notes to Physician**

This material may be rapidly absorbed through the skin. Skin exposure may cause redness, blisters and/or minor to severe chemical burns. Symptoms of exposure may include nausea, headache, dizziness, respiratory failure, muscular weakness, vomiting, severe depression, collapse and death. Although the effects are primarily on the central nervous system, excess accumulation of fluid in the lungs and injury of the kidneys, liver, pancreas and spleen may occur.

5. FIRE FIGHTING MEASURES

**Flammability Classification**

<table>
<thead>
<tr>
<th>Classification</th>
<th>OSHA Classification (29 CFR 1910.1200): Combustible Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NFPA</strong></td>
<td>NFPA Class-II or IIIA Moderately Combustible Liquid</td>
</tr>
<tr>
<td><strong>Ratings</strong></td>
<td>Health: 2, Flammability: 2, Reactivity: 0</td>
</tr>
</tbody>
</table>

**Flash Point**

49-93°C, 120-200°F (Pensky Martens Closed Cup (ASTM D-93))

**Flammable Limits**

Not Determined

**Autoignition Temperature**

Not Determined

**Combustion Products**

Highly dependent on combustion conditions. Fume, smoke, carbon monoxide, carbon dioxide, sulfur and nitrogen oxides, aldehydes and unburned hydrocarbons.

**Fire and Explosion Hazards**

This material is combustible and can be ignited by heat, sparks, flames or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment and electronic devices such as cell phones, computers, calculators and pagers which have not been certified as intrinsically safe). Vapors are heavier than air and can accumulate in low areas. May create vapor/air explosion hazard indoors, in confined spaces, outdoors or in sewers. Vapors may travel considerable distances to a remote source of ignition where they can ignite, flash back or explode. Product can accumulate a static charge that may cause a fire or explosion. A product container, if not properly cooled, can rupture in the heat of a fire. If stored under heat for extended periods for significantly agitated, this material might evolve or release hydrogen sulfide, a flammable and toxic gas, which can raise and widen this material’s actually flammability limits and significantly lower its autoignition temperature.

**Extinguishing Media**

Dry chemical, carbon dioxide or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

**Fire Fighting**

Long duration fires involving product stored in tanks may result in a boilover. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boilover is anticipated. Use water spray to cool fire-exposed containers and to protect personnel. Isolate immediate hazard area and keep unauthorized personnel out. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water. Avoid spreading burning liquid with water used for cooling. For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by regulations, a self-contained breathing apparatus should be worn. Wear other appropriate protective equipment as conditions warrant.
## 6. ACCIDENTAL RELEASE MEASURES

**Protective Measures**
Combustible. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof electrical equipment is recommended. Stay upwind and away from spill/release. Isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment as conditions warrant per Exposure Controls/Personal Protection guidelines.

**Spill Management**
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 pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil. Dispose of contaminated materials in a manner consistent 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 including intermittent dry creeks. 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

**Handling**
Use non-sparking tools and explosion-proof equipment. Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharge. Explosion-proof electrical equipment is recommended and may be required by fire codes. Warning! Use of this material in spaces without adequate ventilation may result in the generation of hazardous levels of combustion products and/or inadequate oxygen levels for breathing. Odor is an inadequate warning for hazardous conditions.

**Storage**
Use and store this material in dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area warnings: ‘No Smoking or Open Flame’. Keep away from incompatible material. Outdoor or detached storage of portable containers is preferred. Indoor storage should meet OSHA standards and appropriate fire codes. In a tank, barge or other closed container, the vapor space above materials containing hydrogen sulfide may result in concentrations immediately dangerous to life or health.

**Special Precautions**
Personal exposures are to be limited by use of a full-face, NIOSH-certified organic vapor mask with particulate prefilter and an APF 25, along with other personal protective equipment outlined in Section 8.

To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Do not use electronic devices (such as cellular phones, computers, calculators, pagers, etc.) in or around any fueling operation or storage area unless the devices are certified as intrinsically safe. Electrical equipment and fittings should comply with local fire codes.

**Portable Containers**
Portable containers should never be filled while they are in or on a motor vehicle or marine craft. Static electricity may ignite vapors when filling non-grounded containers or vehicles on trailers. To avoid static buildup, do not use a nozzle lock open device. Use only approved containers. Keep containers tightly closed. Place the container on the ground before filling. Keep the nozzle in contact with the container during filling.

**Empty Container Warning**
Empty containers retain liquid and vapor residues and can be dangerous. Do NOT pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat, flame,
7. HANDLING AND STORAGE

- Sparks, static electricity or other sources of ignition; they may explode and cause injury or death. Do not attempt to refill or clean containers since residue is difficult to remove. Empty drums should be completely drained, properly closed and returned to the supplier or a qualified drum reconditioner. All containers should be disposed of in an environmentally safe manner in accordance with government regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH Exposure Limits</th>
<th>OSHA Exposure Limits</th>
<th>NIOSH Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown Coal Tar 101316-83-0</td>
<td>5 mg/m³ TWA 10 mg/m³ STEL</td>
<td>5 mg/m³ TWA</td>
<td>2500 mg/m³ IDLH</td>
</tr>
<tr>
<td>Coal Tar Pitch Volatiles 65996-93-2</td>
<td>0.2 mg/m³ TWA</td>
<td>0.2 mg/m³ TWA</td>
<td>80 mg/m³ IDLH</td>
</tr>
</tbody>
</table>

Limits Above Are Applicable to Coal Tar Pitch Volatiles as Benzene Solubles

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH Exposure Limits</th>
<th>OSHA Exposure Limits</th>
<th>NIOSH Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>500 ppm TWA 750 ppm STEL</td>
<td>1000 ppm TWA</td>
<td>250 ppm TWA 2500 ppm IDLH</td>
</tr>
<tr>
<td>Benzene 71-43-2</td>
<td>0.5 ppm TWA 2.5 ppm STEL Skin</td>
<td>1 ppm TWA 5 ppm STEL Skin</td>
<td>0.5 ppm TWA 1 ppm STEL Skin 500 ppm IDLH</td>
</tr>
<tr>
<td>Biphenyl 92-52-4</td>
<td>0.2 ppm TWA 1 ppm STEL Skin</td>
<td>0.2 ppm TWA</td>
<td>100 mg/m³ IDLH</td>
</tr>
<tr>
<td>2-Butanone 78-93-3</td>
<td>200 ppm TWA 300 ppm STEL</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA 300 ppm STEL 3000 ppm IDLH</td>
</tr>
<tr>
<td>Cresols, all isomers 1319-77-3</td>
<td>5 ppm TWA Skin</td>
<td>5 ppm TWA Skin</td>
<td>2.3 ppm TWA 250 ppm IDLH</td>
</tr>
<tr>
<td>Ethyl Benzene 100-41-4</td>
<td>100 ppm TWA 125 ppm STEL</td>
<td>100 ppm TWA 125 ppm STEL</td>
<td>100 ppm TWA 800 ppm IDLH</td>
</tr>
<tr>
<td>Indene 95-13-6</td>
<td>5 ppm TWA</td>
<td></td>
<td>10 ppm TWA</td>
</tr>
<tr>
<td>Naphthalene 91-20-3</td>
<td>10 ppm TWA 15 ppm STEL Skin</td>
<td>10 ppm TWA</td>
<td>10 ppm TWA 250 ppm IDLH</td>
</tr>
<tr>
<td>Phenol 108-95-2</td>
<td>5 ppm TWA Skin</td>
<td>5 ppm TWA Skin</td>
<td>5 ppm STEL Skin</td>
</tr>
<tr>
<td>Polynuclear Aromatic Hydrocarbons (PAH) Mixture</td>
<td>0.2 mg/m³ TWA</td>
<td>0.2 mg/m³ TWA</td>
<td>80 mg/m³ IDLH</td>
</tr>
</tbody>
</table>

*Limits Above Are Applicable to Coal Tar Pitch Volatiles as Benzene Solubles

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH Exposure Limits</th>
<th>OSHA Exposure Limits</th>
<th>NIOSH Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyridine 110-86-1</td>
<td>1 ppm TWA</td>
<td>5 ppm TWA</td>
<td>5 ppm TWA 1000 ppm IDLH</td>
</tr>
<tr>
<td>Toluene 108-88-3</td>
<td>50 ppm TWA Skin</td>
<td>200 ppm TWA</td>
<td>100 ppm TWA 150 ppm STEL 500 ppm IDLH</td>
</tr>
<tr>
<td>Xylene, all isomers 1330-20-7</td>
<td>100 ppm TWA 150 ppm STEL</td>
<td>100 ppm TWA</td>
<td>900 ppm IDLH</td>
</tr>
</tbody>
</table>

General Considerations: Consider the potential hazards of this material, applicable exposure limits, job activities and other substances in the work place when designing engineering controls and selecting personal protective equipment.
**Engineering Controls**

Use process enclosures, local exhaust ventilation or other engineering controls to maintain airborne levels below the recommended exposure limits. An emergency eye wash station and safety shower should be located near the work station.

**Personal Protective Equipment**

If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, personal protective equipment (PPE) is recommended. A hazard assessment of the work should be conducted by a qualified professional to determine what PPE is required.

**Respiratory Protection**

When airborne concentrations are expected to exceed the established exposure limits given in Section 8, use a NIOSH certified tight full-face chemical cartridge respirator (APF 50) with an organic vapor cartridge and dust prefilter. Use a full-face positive-pressure supplied air respirator in circumstances where air-purifying respirators may not provide adequate protection or where they may be the potential for airborne exposure above the exposure limits. If exposure concentration is unknown or IDLH conditions exist, use a NIOSH approved self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode. If internal combustion devices are used in an enclosed space, carbon monoxide will be present in the exhaust. If the airborne concentrations are above the occupational exposure limit for carbon monoxide, use a positive pressure air-supplying respirator.

**Eye Protection**

Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing or spraying of this material.

**Skin and Body Protection**

Avoid skin contact. Use impervious materials to prevent all exposures to the skin (Butyl rubber (IIR), Neoprene, Teflon). Wear long-sleeved fire-retardant garments while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, arm covers, impervious gloves, boots and additional facial protection.

**Hand Protection**

Avoid skin contact. Use impervious gloves (e.g., PVC, viton, neoprene, nitrile rubber). Select the glove based on glove manufacturer’s advice. Wash hands with plenty of mild soap and water before eating, drinking, smoking, using toilet facilities or leaving work.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Dark brown liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>Aromatic, must</td>
</tr>
<tr>
<td>pH</td>
<td>Neutral</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>&gt;1 (air = 1)</td>
</tr>
<tr>
<td>percent Volatile</td>
<td>Negligible</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.01-1.05 @ 60°F</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>Not determined</td>
</tr>
<tr>
<td>Flash Point</td>
<td>120-200°F/49-93°C</td>
</tr>
<tr>
<td>Explosive Limits</td>
<td>Not determined</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Negligible in water</td>
</tr>
</tbody>
</table>

### 10. STABILITY AND REACTIVITY

**Stability**

Stable under normal anticipated storage and handling temperatures and pressures. Combustible liquid.

**Conditions to Avoid**

Avoid all possible sources of ignition.

**Incompatibility (Materials to Avoid)**

Avoid contact with strong oxidizing agents such as strong acids, alkalies, chlorine and other halogens, dichromates or permanganates, which can cause fire or explosion.
10. STABILITY AND REACTIVITY

| Hazardous Decomposition Products | The use of hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels. |
| Hazardous Polymerization         | Will not occur |

11. TOXICOLOGICAL INFORMATION

### Information on Toxicological Effects of Substance/Mixture

#### Likely Routes of Entry
- Inhalation, ingestion, skin or eye absorption

#### Symptoms of Exposure
- **Inhalation**: Breathless, irritable, euphoric or giddy, headache, dizziness, nausea, intoxication, irritations of eyes, nose and respiratory tract. Severe exposures may lead to convulsions and loss of consciousness. Skin can become red, dry, scaly and fissured. Persons can become sensitized from skin contact, may cause photosensitization and dermatitis. Eye tissue may be damaged. Generally, the more serious the exposure the more severe the symptoms.

#### Potential Acute Health Effects

| Inhalation | Breathing high concentrations may be harmful. Mist or vapor is destructive to tissue of the mucous membranes and upper respiratory tract. Breathing this material may cause central nervous system depression with symptoms including nausea, headache, dizziness, fatigue, drowsiness or unconsciousness. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, burning sensation, coughing, wheezing, laryngitis, shortness of breath, blurred vision and pulmonary edema (fluid accumulation in lungs). Severe exposures can result in nausea, vomiting, muscle weakness or convulsions, respiratory failure and death. Hydrogen sulfide and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. |

| Eye Contact | This product has a strong corrosive effect on the eyes and can cause eye irritation from short-term contact with liquid, mists or vapors. Symptoms include stinging, watering, redness and inflammation. Effects may be more serious with repeated or prolonged contact. Direct contact with the eye may result in mild damage, conjunctivitis and keratitis, to severe damage, ranging from scarring of the cornea to total blindness. |

| Skin Contact | This product is a skin irritant and may cause allergic skin reaction. Contact may cause redness, itching, burning, skin damage and chemical burns. This material contains polynuclear aromatic hydrocarbons (coal tar pitch volatiles) that have been known to produce a phototoxic reaction when contaminated skin is exposed to sunlight. The effect is similar in appearance to an exaggerated sunburn, and is temporary in duration if exposure is discontinued. Continued exposure to sunlight can result in more serious skin problems including pigmentation (discoloration), skin eruptions (pimples) and possible skin cancers. Contact with heated material may cause thermal burns. |

| Ingestion | Ingestion may result in irritation to digestive tract. Symptoms may include headache, excitement, fatigue, nausea, vomiting, diarrhea, central nervous system depression, rapid heartbeat, cardiac arrhythmia, stupor and coma ultimately culminating in death. Contact with heated material may cause thermal burns. |
11. TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Potential Chronic Health Effects</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signs and Symptoms</strong></td>
<td>Chronic effects of overexposure are similar to acute effects including central nervous system (CNS) effects and CNS depression. Effects of overexposure may also include irritation of the digestive tract, irritation of the respiratory tract, nausea, skin dermatitis and pigmentary disorder. Serious and sometimes fatal systemic injury can result from chronic exposure. Components may be photosensitizing.</td>
</tr>
<tr>
<td><strong>Carcinogenic Potential</strong></td>
<td>Components of this product have been shown to be mutagenic and induce skin tumors. This material may contain benzene, ethyl benzene, naphthalene and polynuclear aromatic hydrocarbons (PAH) at concentrations above 0.1%. Benzene and PAH are considered to be known human carcinogens by OSHA, IARC and NTP. IARC has identified several individual PAH as probably carcinogenic to humans (Group 2A) and ethyl benzene, naphthalene and several individual PAH as possibly carcinogenic to humans (Group 2B) based on laboratory animal studies.</td>
</tr>
<tr>
<td><strong>Target Organs</strong></td>
<td>May cause damage to blood, lungs, mucous membranes, eyes, the reproductive system, kidneys, liver, spleen, peripheral nervous system, cardiovascular system, respiratory system, skin, bone marrow, immune system and central nervous system.</td>
</tr>
<tr>
<td><strong>Conditions Aggravated by Overexposure</strong></td>
<td>Disorders of the following organs or organ systems that may be aggravated by significant exposure to this material or its components include the skin, respiratory system, liver, kidneys, CNS, immune system, cardiovascular system and blood-forming system. Those attempting to conceive should avoid exposure. Many components of this product are both toxic and carcinogenic and may cause fetal defects.</td>
</tr>
</tbody>
</table>

**Toxicological Information**

<table>
<thead>
<tr>
<th>Acute Toxicity</th>
<th>No test data available for this complex mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinogenicity</td>
<td>Extracted from Report on Carcinogens, Twelfth Edition (2011) for coal tar and coal tar pitches (CAS 8007-45-2): <strong>Carcinogenicity:</strong> Coal tars and coal-tar pitches are known to be human carcinogens based on sufficient evidence of carcinogenicity from studies in humans. <strong>Cancer Studies in Humans</strong> - Numerous studies, mostly case reports, have found that occupational exposure to coal tars or coal-tar pitches (coal-tar distillates) is associated with skin cancer, including scrotal cancer; workers in these studies have included patent-fuel (coal-briquette) workers, pitch loaders, workers in electrical trades, and optical-lens polishers (IARC 1985, 1987). A 1946 study in the United Kingdom found that patent-fuel workers were 500 times as likely as other workers to die of scrotal cancer. In addition, there have been many case reports of skin cancer among patients using therapeutic coal-tar preparations. Occupational exposure to coal tars or coal-tar pitches has also been associated with cancer at other tissue sites, including the lung, bladder, kidney, and digestive tract. Excesses of lung cancer were found in several epidemiological studies of workers exposed to coal-tar fumes in coal gasification and coke production, in studies of workers exposed to pitch fumes in aluminum production and calcium carbide production, and in a study of millwrights and welders exposed to coal-tar pitches and coal tars. The millwrights and welders also showed increased risks of digestive-tract cancer and leukemia. The risk of bladder cancer was increased in tar distillers and patent-fuel workers exposed to coal tars and coal-tar pitches and in aluminum production workers exposed to coal-tar pitches. The risk of kidney (renal-pelvis) cancer was increased in workers exposed to &quot;petroleum or tar or pitch.&quot; Studies of roofers, who are exposed to coal-tar pitches, have found increased risks of cancer at other tissue sites in addition to skin, bladder, and lung cancer and leukemia, including cancer.</td>
</tr>
</tbody>
</table>
11. TOXICOLOGICAL INFORMATION

of the oral cavity, larynx, esophagus, and stomach; however, roofers are also exposed to other potentially carcinogenic agents, such as asphalt.

_Cancer Studies in Experimental Animals_ - Dermal exposure to coal tars (including pharmaceutical and high-temperature coal tars) or coal-tar extracts caused skin tumors in mice and rabbits and lung cancer (but not skin tumors) in rats. Inhalation exposure to coal tar from coke ovens caused skin tumors in mice and lung tumors in mice and rats. An extract of a coal-tar fume condensate administered by intramuscular injection caused tumors at the injection site (sarcoma) in mice. Dermal exposure to coal-tar pitches or coal-tar pitch extracts caused benign and malignant skin tumors in mice (IARC 1985, 1987).

_Studies on Mechanisms of Carcinogenesis_ - Both coal tars and coal-tar pitches contain a number of known and potential carcinogens, including benzene, naphthalene, and other polycyclic aromatic hydrocarbons (PAHs). Coal-tar pitch extracts showed both tumor-initiating and tumor-promoting activity in mouse skin (IARC 1985, 1987).

Mutagenicity Components in this mixture have shown positive mutagenic effects in toxicological testing.

Information on Toxicological Effects of Components

**Benzene 71-43-2**

**Acute Data:**
- Dermal LD50 > 9400 mg/kg (Rabbit), (Guinea Pig)
- LC50 = 9980 ppm (Mouse); 10,000 ppm/7hr (Rat)
- Oral LD50 = 4700 mg/kg (Mouse); 930 mg/kg (Rat); 5700 mg/kg (Mammal)

_Carcinogenicity:_ Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

_Target Organs:_ Prolonged or repeated exposures to benzene vapors has been linked to bone marrow toxicity which can result in blood disorders such as leukopenia, thrombocytopenia, and aplastic anemia. All of these diseases can be fatal.

_Developmental:_ Exposure to benzene during pregnancy demonstrated limited evidence of developmental toxicity in laboratory animals. The effects seen include decreased body weight, increased skeletal variations in rodents. Alterations in hematopoiesis have been observed in the fetuses and offspring of pregnant mice.

_Mutagenicity:_ Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells, and DNA damage in mammalian cells in vitro.

**Biphenyl 92-52-4**

**Acute Toxicity:**
- Oral LD50 = 2400 mg/kg (Rat)
- TCL0 = 4.4 mg/m³ Inhalation Human Irritant Effects

**Cresols, all isomers 1319-77-3**

**Acute Toxicity:**
- Dermal LD50 = 2000 mg/kg (Rabbit)
- Oral LD50 = 760 mg/kg (Mouse)

**Ethyl Benzene 100-41-4**

**Acute Toxicity:**
- Dermal LD50 = 17800 mg/kg (Rabbit)
- LC50 = 4000 ppm/4 hr; 13367 ppm (Rat)
- Oral LD50 = 3500 mg/kg (Rat)

_Carcinogenicity:_ Rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study demonstrated limited evidence of kidney, liver, and lung cancer. Ethyl benzene has been listed as a possible human carcinogen by IARC. Ethyl benzene has not been listed as a carcinogen by OSHA.

_Target Organs:_ In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year
11. TOXICOLOGICAL INFORMATION

- Inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilic foci, hypertrophy, necrosis), thyroid (hyperplasia) and pituitary (hyperplasia).

### Naphthalene 91-20-3

#### Acute Toxicity:
- Dermal LD50 = >2.5 g/kg (rat)
- LC50 = >340 mg/m³/1H (rat)
- Oral LD50 = 490 mg/kg; 2.6 g/kg (rat)

#### Carcinogenicity:
Naphthalene has been evaluated in two year inhalation studies in both rats and rice. The National Toxicology Program (NTP) concluded that there is clear evidence of carcinogenicity in male and female rats based on increased incidences of respiratory epithelial adenomas and olfactory epithelial neuroblastomas of the nose. NTP found some evidence of carcinogenicity in female mice (alveolar adenomas) and no evidence of carcinogenicity in male mice. Naphthalene has been identified as a carcinogen by IARC and NTP.

### Phenol 108-95-2

#### Acute Toxicity:
- LC₅₀ = 360 mg/m³ inhalation (Rat)
- LDLo – 14 g/kg Oral, Human

### Toluene 106-88-3

#### Acute Toxicity:
- Dermal LD50 = 14 g/kg (Rabbit)
- LC50 = 8,000 ppm (4-hr, Rat)
- Oral LD50 = 2.5 - 7.9 g/kg (Rat)

#### Target Organs:
Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.

#### Developmental:
Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. The effects seen include decreased fetal body weight and increased skeletal variations in both inhalation and oral studies.

### Xylenes 1330-20-7

#### Acute Toxicity:
- Dermal LD50 >3.16 ml/kg (Rabbit)
- LC50= 5000 ppm/4 hr. (Rat)
- Oral LD50 = 4300 mg/kg (Rat)

#### Target Organs:
A six week inhalation study with xylene produced hearing loss in rats.

#### Developmental:
Both mixed xylenes and the individual isomers produced limited evidence of developmental toxicity in laboratory animals. Inhalation and oral administration of xylene resulted in decreased fetal weight, increased incidences of delayed ossification, skeletal variations and resorptions.

12. ECOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Ecotoxicity</th>
<th>This material is expected to be toxic to aquatic organisms. 96 hour(s) LC50 for phenol: 11.6 mg/l (trout)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence and Degradability</td>
<td>Persistent. The highest molecular weight components are persistent in water. The EPA estimates this material will persist in the environment for more than two months.</td>
</tr>
<tr>
<td>Bioaccumulation Potential</td>
<td>Bioaccumulative. Based upon spill investigation analysis, oils containing polynuclear aromatic hydrocarbon compounds similar to this material were shown to bioaccumulate in tissues of various aquatic organisms. The EPA estimates a bioaccumulation factor of greater than or equal to 1000.</td>
</tr>
<tr>
<td>Mobility in Soil</td>
<td>Mobile. The lower molecular weight are mobile in soil.</td>
</tr>
<tr>
<td>Environmental</td>
<td>Coating action can kill birds, plankton, aquatic life, algae and fish. The individual</td>
</tr>
</tbody>
</table>
12. ECOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Fate</th>
<th>components of this material are differentially soluble in water with aromatic hydrocarbons tending to be more water soluble than aliphatic hydrocarbons. If spilled, the lighter components will generally evaporate but depending on local environmental conditions (temperature, wind, soil type, mixing or wave action in water, etc), photodegradation and biodegradation, some may become dispersed in the water column, and a significant portion may be or absorbed to soil or sediment. Because of their differential solubility, the occurrence of components in groundwater will be at different proportions than the parent material. This material is estimated to have a slow rate of biodegradation. Under anaerobic conditions, such as in anoxic sediments, rates of biodegradation are negligible.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Adverse Effects</td>
<td>None anticipated</td>
</tr>
</tbody>
</table>

13. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, is not a RCRA “listed” hazardous waste. However, it should be fully characterized for toxicity and possibly ignitability or reactivity prior to disposal (40 CFR 261). Use which results in chemical or physical change or contamination may subject it to regulation as a hazardous waste. Along with properly characterizing all waste materials, consult state and local regulations regarding the proper disposal of this material.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a qualified drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

14. TRANSPORTATION INFORMATION

<table>
<thead>
<tr>
<th>United States Department of Transportation (US DOT)</th>
<th>Shipping Description: Coal Tar Distillates, Flammable, UN1136 3, II RQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping Name: Coal Tar Distillates, Flammable</td>
<td></td>
</tr>
<tr>
<td>Hazard Class and Division: 3</td>
<td></td>
</tr>
<tr>
<td>ID Number: UN1136</td>
<td></td>
</tr>
<tr>
<td>Packing Group: III</td>
<td></td>
</tr>
<tr>
<td>Label: Combustible Liquid</td>
<td></td>
</tr>
<tr>
<td>Placard: Combustible</td>
<td></td>
</tr>
<tr>
<td>Reportable Quantity: 500 lb, Benzopyrene</td>
<td></td>
</tr>
<tr>
<td>Emergency Response Guide: 128</td>
<td></td>
</tr>
<tr>
<td>MARPOL III Status: DOT Marine Pollutant per 49 CFR 171.8</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>International Maritime Organization International Maritime Dangerous Goods Code (IMO/IMDG)</th>
<th>Shipping Description: UN1136, Coal Tar Distillates, Flammable, 3, III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping Name: Coal Tar Distillates, Flammable</td>
<td></td>
</tr>
<tr>
<td>Hazard Class and Division: 3</td>
<td></td>
</tr>
<tr>
<td>UN Number: 1136</td>
<td></td>
</tr>
<tr>
<td>Label: Flammable Liquid</td>
<td></td>
</tr>
<tr>
<td>EMS Guide: F-E, S-E, S-D</td>
<td></td>
</tr>
<tr>
<td>MARPOL III Status: DOT Marine Pollutant per 49 CFR 71.8</td>
<td></td>
</tr>
</tbody>
</table>

15. REGULATORY INFORMATION

<table>
<thead>
<tr>
<th>United States Federal Regulatory Information</th>
<th>A Premanufacture Notice (PMN) was submitted to EPA 1/24/12 under the Toxic Substances Control Act (TSCA) Section 5 rules (P-12-0167). On</th>
</tr>
</thead>
</table>
2/13/12, the EPA website lists the status as ‘drop with non-5(e) SNUR’ indicating the PMN notice has been dropped from further review for the use(s) as submitted in the notice. A non-5(e) SNUR is one promulgated in the absence of a Consent Order that identifies potential new uses different from those represented in the PMN that could result in increased exposures or releases of the substance and an unreasonable risk to health or the environment. The PMN lists the uses of this product as (1) sold to off-site vendors for blending the existing tar oil with petroleum oil for feed to refineries and (2) sold to off-site vendors for feedstock to a hydrocracker process to make different cut of fuels to blend with other fuels. One of the block flow diagrams shows railcar offloading the product to tar oil storage in floating roof tanks and fuel blending.

The EPA intends to regulate the product with a Significant New Use Rule (SNUR) under the general provisions of 40 CFR 172.170. Recordkeeping requirements at 40 CFR 721.125(a), (b), (c) and (k) will be required. Each manufacturer, importer, and processor of the substance will be required to maintain records for 5 years of:

(a) the manufacture and importation volume of the substance and the corresponding dates of manufacture and import.
(b) the volumes of the substance purchased in the United States by processors of the substance, names and addresses of suppliers, and dates of purchase.
(c) names and addresses (including shipment destination address) of all persons outside the site of manufacture, importation, or processing to whom the manufacturer, importer, or processor directly sells or transfers the substance, the date of each sale or transfer, and the quantity of the substance sold or transferred
(k) establishment and implementation of procedures that ensure compliance with any applicable water discharge limitations under 40 CFR 721.90.

The chemical substance will have certain restrictions on releases and/or exposures under a non-5(e) SNUR. In an April 9, 2012 letter from EPA, the Agency indicated its intent to promulgate a SNUR in which the restrictions stated in 40 CFR 721.90 (a)(1), (b)(1) and (c)(1) apply to this substance. These restrictions define the minimum treatment processes required before there is a discharge to surface water, without this treatment the release would be considered subject to a SNUR. The SNUR will require submission of a Significant New Use Notice (SNUN) to EPA 90 days prior to the predictable or purposeful release containing the PMN substance into surface water, including any potential releases from cleaning equipment and transport containers. Personal exposures are to be limited by use of a full-face, NIOSH-certified organic vapor mask with particulate prefilter and an APF 25.

Export of this product triggers notification requirements under 40 CFR Part 707. Per 40 CFR 707.65, exporters must notify EPA of their export or intended export of each regulated chemical. For substances or mixtures subject to TSCA Section 4, 5(a)(2), 5(b) or 5(e) actions, the exporter must submit a notice to EPA only for the first export to a particular country. The notice must be postmarked within seven days of forming the intent to export or on the date of export, whichever is earlier. A notice of intent to export must be based on a definite contractual obligation, or an equivalent intra-company agreement, to export the regulated chemical. The notice must be submitted by letter to EPA and include the following...
15. REGULATORY INFORMATION

EPA SARA 302/304 Emergency Planning and Notification
This material contains the following chemicals subject to reporting under the Superfund Amendments and Reauthorization Act of 1986 (SARA):

<table>
<thead>
<tr>
<th>Section 302 EHS</th>
<th>TPQ (lb)</th>
<th>EPCRA RQ (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Sulfide</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>o-Cresol</td>
<td>1000</td>
<td>100</td>
</tr>
<tr>
<td>Phenol</td>
<td>500</td>
<td>1000</td>
</tr>
</tbody>
</table>

EPA SARA 311/312 (Title III Hazard Categories)
Acute Health: Yes
Chronic Health: Yes
Fire Hazard: Yes
Pressure Hazard: No
Reactive Hazard: No

EPA SARA Toxic Chemical Notification and Release Reporting (40 CFR 372) and CERCLA Reportable Quantities (40 CFR 302.4)

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS Number</th>
<th>Concentration (%)</th>
<th>RQ (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>&lt; 1</td>
<td>10</td>
</tr>
<tr>
<td>Biphenyl</td>
<td>92-52-4</td>
<td>&lt; 5</td>
<td>100</td>
</tr>
<tr>
<td>Cresols, all isomers</td>
<td>1319-77-3</td>
<td>&lt; 5</td>
<td>100</td>
</tr>
<tr>
<td>Ethyl Benzene</td>
<td>100-41-4</td>
<td>&lt; 1</td>
<td>1000</td>
</tr>
<tr>
<td>Methyl Pyridines</td>
<td>109-06-8</td>
<td>&lt; 1</td>
<td>5000</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>&lt; 5</td>
<td>100</td>
</tr>
<tr>
<td>Phenol</td>
<td>108-95-2</td>
<td>&lt; 5</td>
<td>1000</td>
</tr>
<tr>
<td>Polycyclic Aromatics mixture</td>
<td></td>
<td>&lt; 25</td>
<td>NA</td>
</tr>
<tr>
<td>Pyridine</td>
<td>110-86-1</td>
<td>&lt; 1</td>
<td>1000</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>&lt; 5</td>
<td>1000</td>
</tr>
<tr>
<td>Xylene, all isomers</td>
<td>1330-20-7</td>
<td>&lt; 5</td>
<td>100</td>
</tr>
</tbody>
</table>

EPA CWA and OPA
This product is not classified as an oil under Section 311 of the Clean Water Act (CWA) and Oil Pollution Act of 1990 (OPA), and is subject to spill reporting requirements.

Carcinogen Identification by International Agency for Research on Cancer

<table>
<thead>
<tr>
<th>Group</th>
<th>Carcinogenic to Humans</th>
<th>Benzene, Coal Tar Pitch Volatiles (per 29 CFR 1910.1200.1002, OSHA has defined coat tar pitch volatiles to include the fused polycyclic hydrocarbons which volatize from the distillation residues of coal, petroleum (excluding asphalt), wood and other organic matter, Coal Tar Distillation,</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 2A</td>
<td>Probably Carcinogenic to Humans</td>
<td>Several Individual Polycyclic Aromatic Hydrocarbons</td>
</tr>
<tr>
<td>Group 2B</td>
<td>Possibly Carcinogenic to Humans</td>
<td>Ethyl Benzene, Naphthalene, Several Individual Polycyclic Aromatic Hydrocarbons</td>
</tr>
<tr>
<td>Group 3</td>
<td>Not Classifiable</td>
<td></td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION

Prepared By J.P. Morgan Ventures Energy Corporation
383 Madison Avenue, 10th Floor
New York, NY 10017
16. OTHER INFORMATION

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