Material Safety Data Sheet

MSDS ID NO.: 0203MAR001
Revision date: 01/11/2011

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product name: Marathon Methane
Synonym: Coal Bed Methane; Gas Plant Methane
Chemical Family: Petroleum Hydrocarbon
Formula: CH4

Manufacturer:
Marathon Oil Company
539 South Main Street
Findlay OH 45840

Other information: 419-421-3070
Emergency telephone number: 877-627-5463

2. COMPOSITION/ INFORMATION ON INGREDIENTS

Methane is an aliphatic petroleum hydrocarbon.

Product information:

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS Number</th>
<th>Weight %</th>
<th>ACGIH Exposure Limits:</th>
<th>OSHA - Vacated PELs - Time Weighted Ave</th>
<th>Other:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marathon Methane</td>
<td>74-82-8</td>
<td>100</td>
<td>1000 ppm TWA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Component Information:

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS Number</th>
<th>Weight %</th>
<th>ACGIH Exposure Limits:</th>
<th>OSHA - Vacated PELs - Time Weighted Ave</th>
<th>Other:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>74-82-8</td>
<td>85-97</td>
<td>1000 ppm TWA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrogen</td>
<td>7727-37-9</td>
<td>4-14</td>
<td>Simple Asphyxiant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>124-38-9</td>
<td>0.5-2.5</td>
<td>5000 ppm TWA</td>
<td>= 10000 ppm TWA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30000 ppm STEL</td>
<td>= 18000 mg/m³ TWA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>= 30000 ppm STEL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>= 54000 mg/m³ STEL</td>
<td></td>
</tr>
<tr>
<td>Ethane</td>
<td>74-84-0</td>
<td>1-2</td>
<td>1000 ppm TWA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: The manufacturer has voluntarily elected to reflect exposure limits contained in OSHA's 1989 air contaminants standard in its MSDS's, even though certain of those exposure limits were vacated in 1992.
3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER!

MAY REDUCE OXYGEN AVAILABLE FOR BREATHING
OVEREXPOSURE MAY CAUSE CNS DEPRESSION
SEE TOXICOLOGICAL INFORMATION SECTION FOR MORE INFORMATION

EXTREMELY FLAMMABLE GAS UNDER PRESSURE.
MAY CAUSE FLASH FIRE OR EXPLOSION

STABLE

Inhalation:
Product is an anesthetic at high concentrations, producing dizziness, headache, incoordination and narcosis; extremely high concentrations can cause asphyxiation and death by displacement of oxygen from the breathing atmosphere.

Ingestion:
Ingestion not likely.

Skin contact:
Vapor is generally non-irritating to skin.

Eye contact:
Vapor is generally non-irritating to eyes.

Carcinogenic Evaluation:

<table>
<thead>
<tr>
<th>Product information:</th>
<th>IARC Carcinogens:</th>
<th>NTP Carcinogens:</th>
<th>ACGIH - Carcinogens:</th>
<th>OSHA - Select Carcinogens:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marathon Methane 74-82-8</td>
<td>NE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: The International Agency for Research on Cancer (IARC) has not evaluated this product.

Component Information:
4. FIRST AID MEASURES

Eye Contact: Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get medical attention if irritation persists.

Skin Contact: If irritation or other symptoms occur get medical attention.

Ingestion: Ingestion not likely. If swallowed, immediately call a physician.

Inhalation: Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear and give oxygen. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). GET IMMEDIATE MEDICAL ATTENTION.

NOTES TO PHYSICIAN:

No data available.

Medical Conditions Aggravated By Exposure:

No data available.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Fire fighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Specific hazards: This product has been determined to be a flammable gas per the OSHA Hazard Communication Standard, and should be handled accordingly. For additional fire related information see NFPA 30 or North American Emergency Response Guide 115.

Special protective equipment for firefighters: Bleve’s (boiling liquid expanding vapor explosions) can occur when a liquid in a pressurized container in close proximity to a fire reaches a temperature well above its boiling point. Its effect could lead to a catastrophic failure of the vessel resulting in flying equipment fragments, a shock wave and a fireball causing serious damage and death. Isolate hazard area. If safe to do so, stop the flow of gas and allow fire to burn out. Extinguishing the flame before shutting off the supply can cause the formation of explosive mixtures. In some cases it may be preferred to allow the flame to continue to burn. Keep surrounding area cool with water spray from a distance and prevent further ignition of combustible material. Avoid use of solid water streams. Contact with water and liquified product can cause increased vaporization.

Flash point: -306 F
Autoignition temperature: No data available.
Flammable limits in air - lower (%): 5.3
Flammable limits in air - upper (%): 14

MSDS ID NO.: 0203MAR001  Product name: Marathon Methane
6 ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Leaking containers should be moved outdoors or to well-ventilated area and contents transferred to a suitable container. Product vapor is heavier than air and can collect in low areas that are without sufficient ventilation. Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer.

7. HANDLING AND STORAGE

Handling: Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Avoid overpressurizing or overfilling cylinders. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Avoid repeated and prolonged skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

Engineering measures: Local or general exhaust required in an enclosed area or when there is inadequate ventilation.

Respiratory protection: Use atmosphere supplying respirators in the event of oxygen deficiency, when material produces vapors that exceed permissible limits or when excessive vapors are generated. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 1910.134. Self-contained breathing apparatus should be used for fire fighting.

Skin and body protection: No data available.

Eye protection: Use goggles or face-shield if there is a potential for splashing.

Hygiene measures: Use mechanical ventilation equipment that is explosion-proof.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Appearance: Colorless Gas
Physical state (Solid/Liquid/Gas): Gas
Substance type (Pure/Mixture): Mixture
Color: Colorless
Odor: Odorless
Molecular weight: 16
pH: Neutral
Boiling point/range (5-95%): -259 F
Melting point/range: Not determined.
9. PHYSICAL AND CHEMICAL PROPERTIES:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decomposition temperature</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>0.42 Liquid</td>
</tr>
<tr>
<td>Density</td>
<td>3.5 lbs/gal @ 32 F</td>
</tr>
<tr>
<td>Bulk density</td>
<td>No data available.</td>
</tr>
<tr>
<td>Vapor density</td>
<td>C.A. 1</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available.</td>
</tr>
<tr>
<td>Solubility</td>
<td>Negligible</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>No data available.</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>No data available.</td>
</tr>
<tr>
<td>VOC content(%)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available.</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability</td>
<td>The material is stable at 70 F, 760 mm pressure.</td>
</tr>
<tr>
<td>Polymerization</td>
<td>Will not occur.</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Carbon monoxide and carbon dioxide</td>
</tr>
<tr>
<td>Materials to avoid</td>
<td>Strong oxidizers such as nitrates, perchlorates, chlorine, fluorine.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>Sources of heat or ignition.</td>
</tr>
</tbody>
</table>

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

<table>
<thead>
<tr>
<th>Product information:</th>
<th>CAS Number</th>
<th>Inhalation:</th>
<th>Dermal:</th>
<th>Oral:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td><strong>CAS Number</strong></td>
<td><strong>LC50 = 900,000 ppm [Cats]</strong></td>
<td><strong>No data available</strong></td>
<td><strong>No data available</strong></td>
</tr>
<tr>
<td>Marathon Methane</td>
<td>74-82-8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Toxicology Information:
METHANE and ETHANE: Exposure to high levels of these gases produce weak central nervous system (CNS) depressant effects without significant potential for systemic toxicity. At very high levels they act as asphyxiants by diluting and displacing oxygen. Symptoms of persons exposed to oxygen deficient atmospheres include headache, dizziness, incoordination, cyanosis and narcosis. Extremely high concentrations can produce unconsciousness followed by death.

CARBON DIOXIDE: Carbon dioxide is a chemical asphyxiant and has no warning properties (such as odor). Inhalation of high concentrations can produce mild narcotic effects and stimulation of the respiratory centers. Headache and dyspnea (difficulty in breathing) may occur on exertion following prolonged breathing of lower concentrations. Reduced visual acuity and mild tachycardia and hypertension may be seen. Long term exposure to moderate concentrations can cause acidosis and adverse effects on calcium-phosphorus metabolism. Sleepiness, mental confusion, giddiness, lassitude (weakness), noise in the ear, weakened reflexes, tremors, flaccid paralysis, coma, and death may all occur from carbon dioxide poisoning, largely as hypoxic symptoms from displacement of oxygen. Eye, nose and throat irritation can occur at very high concentrations. Poisoning may affect the lungs, heart, kidney and central nervous system. It is also a vasodilator and is the most potent cerebrovascular dilator known. Inhalation of carbon dioxide has been teratogenic and has caused both male and female adverse reproductive effects in rodents.

NITROGEN: Nitrogen is a simple asphyxiant gas without significant potential for systemic toxicity. At very high concentrations, it acts as an asphyxiating gas by diluting and displacing oxygen. Symptoms of persons exposed to oxygen deficient atmospheres include headache, dizziness, incoordination, cyanosis and narcosis. Extremely high concentrations can produce unconsciousness followed by death.

TARGET ORGANS:  

central nervous system,

ECOTOXICOLOGICAL INFORMATION

Mobility:  
Not classified in terms of mobility in air, soil and water.

Ecotoxicity:  
Not classified in terms of aquatic toxicity.

Bioaccumulation:  
Not expected to bioaccumulate in aquatic organisms.

Persistance/Biodegradation:  
Readily biodegradable in the environment.

DISPOSAL CONSIDERATIONS
13. DISPOSAL CONSIDERATIONS

Cleanup Considerations: This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of an "characteristic" hazardous waste. This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations. Bleeding off small amounts of this product into the atmosphere or controlled incineration of large amounts are potential disposal methods provided all regulatory requirements are met.

14. TRANSPORT INFORMATION

49 CFR 172.101:

DOT: This material when transported via US commerce would be regulated by DOT Regulations.

Proper shipping name: Methane, Compressed
UN/Identification No: UN 1971
Hazard Class: 2.1
Packing group: Not applicable.
DOT reportable quantity (lbs): Not applicable.

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

OSHA Hazard Communication Standard: This product has been evaluated and determined to be hazardous as defined in OSHA's Hazard Communication Standard.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product contains the following component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

<table>
<thead>
<tr>
<th>Name</th>
<th>CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>NA</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>NA</td>
</tr>
</tbody>
</table>

MSDS ID NO.: 0203MAR001  Product name: Marathon Methane
**SARA Section 302:**
This product contains the following component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

<table>
<thead>
<tr>
<th>Name</th>
<th>CERCLA/SARA - Hazardous Substances and their Reportable Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>NA</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>NA</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>NA</td>
</tr>
<tr>
<td>Ethane</td>
<td>NA</td>
</tr>
</tbody>
</table>

**SARA Section 311/312:**
The following EPA hazard categories apply to this product:
- Fire Hazard
- Sudden Release Of Pressure

**SARA Section 313:**
This product contains the following component(s) that may be subject to reporting on the Toxic Release Inventory (TRI) From R:

<table>
<thead>
<tr>
<th>Name</th>
<th>CERCLA/SARA 313 Emission reporting:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>None</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>None</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>None</td>
</tr>
<tr>
<td>Ethane</td>
<td>None</td>
</tr>
</tbody>
</table>

**State and Community Right-To-Know Regulations:**
The following component(s) of this material are identified on the regulatory lists below:

**Methane**
- Louisiana Right-To-Know: Not Listed
- California Proposition 65: Not Listed
- New Jersey Right-To-Know: sn 1202
- Pennsylvania Right-To-Know: Present
- Massachusetts Right-To-Know: Present
- Florida substance List: Not Listed.
- Rhode Island Right-To-Know: Toxic
- Michigan critical materials register list: Not Listed.
- Massachusetts Extraordinarily Hazardous Substances: Not Listed
  - California - Regulated Carcinogens: Not Listed
  - Pennsylvania RTK - Special Hazardous Substances: Not Listed
- New Jersey - Special Hazardous Substances: flammable - fourth degree
- New Jersey - Environmental Hazardous Substances List: SN 1202 TPQ 500 lb
- Illinois - Toxic Air Contaminants: Not Listed
- New York - Reporting of Releases Part 597 - List of Hazardous Substances: Not Listed

**Nitrogen**
- Louisiana Right-To-Know: Not Listed
- California Proposition 65: Not Listed
- New Jersey Right-To-Know: sn 1375 (compressed or liquefied)
- Pennsylvania Right-To-Know: Present
- Massachusetts Right-To-Know: Present
Methane

Florida substance List: Not Listed.
Rhode Island Right-To-Know: Flammable
Michigan critical materials register list: Not Listed.
Massachusetts Extraordinarily Hazardous Substances: Not Listed
California - Regulated Carcinogens: Not Listed
Pennsylvania RTK - Special Hazardous Substances: Not Listed

New Jersey - Special Hazardous Substances: Not Listed
New Jersey - Environmental Hazardous Substances List: Not Listed
Illinois - Toxic Air Contaminants: Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances: Not Listed

Carbon Dioxide

Louisiana Right-To-Know: Not Listed
California Proposition 65: Not Listed
New Jersey Right-To-Know: sn 0343
Pennsylvania Right-To-Know: Present
Massachusetts Right-To-Know: Present
Florida substance List: Not Listed.
Rhode Island Right-To-Know: Toxic
Michigan critical materials register list: Not Listed.
Massachusetts Extraordinarily Hazardous Substances: Not Listed
California - Regulated Carcinogens: Not Listed
Pennsylvania RTK - Special Hazardous Substances: Not Listed

New Jersey - Special Hazardous Substances: Not Listed
New Jersey - Environmental Hazardous Substances List: Not Listed
Illinois - Toxic Air Contaminants: Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances: Not Listed

Ethane

Louisiana Right-To-Know: Not Listed
California Proposition 65: Not Listed
New Jersey Right-To-Know: sn 0834
Pennsylvania Right-To-Know: Present
Massachusetts Right-To-Know: Present
Florida substance List: Not Listed.
Rhode Island Right-To-Know: Toxic
Michigan critical materials register list: Not Listed.
Massachusetts Extraordinarily Hazardous Substances: Not Listed
California - Regulated Carcinogens: Not Listed
Pennsylvania RTK - Special Hazardous Substances: Not Listed

New Jersey - Special Hazardous Substances: flammable - fourth degree
New Jersey - Environmental Hazardous Substances List: SN 0834 TPQ 500 lb
Illinois - Toxic Air Contaminants: Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances: Not Listed
Methane

**Canadian Regulatory Information:**

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

<table>
<thead>
<tr>
<th>Name</th>
<th>Canada - WHMIS: Classifications of Substances:</th>
<th>Canada - WHMIS: Ingredient Disclosure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>A, B1</td>
<td></td>
</tr>
<tr>
<td>Nitrogen</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>A; Uncontrolled product according to WHMIS</td>
<td>1 %</td>
</tr>
<tr>
<td></td>
<td>classification criteria (solid)</td>
<td></td>
</tr>
<tr>
<td>Ethane</td>
<td>A, B1</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Not Applicable.

### 16. OTHER INFORMATION

**Additional Information:** No data available.

**Prepared by:** Mark S. Swanson, Manager, Toxicology and Product Safety

The information and recommendations contained herein are based upon tests believed to be reliable. However, Marathon Oil Company (MOC) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage maybe required. Marathon assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

**End of Safety Data Sheet**