

## MATERIAL SAFETY DATA SHEET

Product Trade Name: **GEM Fluid System**

Revision Date: 02-Sep-2011

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

Product Trade Name: GEM Fluid System  
Synonyms: None  
Chemical Family: Blend  
Application: Mud System

Manufacturer/Supplier: Baroid Fluid Services  
Product Service Line of Halliburton  
P.O. Box 1675  
Houston, TX 77251  
Telephone: (281) 871-4000  
Emergency Telephone: (281) 575-5000

Prepared By: Chemical Compliance  
Telephone: 1-580-251-4335  
e-mail: fdunexchem@halliburton.com

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

| Substances                 | CAS Number | PERCENT  | ACGIH TLV-TWA           | OSHA PEL-TWA                                  |
|----------------------------|------------|----------|-------------------------|-----------------------------------------------|
| Barium sulfate             | 7727-43-7  | 10 - 30% | 10 mg/m <sup>3</sup>    | 15 mg/m <sup>3</sup>                          |
| Polyalkylene glycol        |            | 1 - 5%   | Not applicable          | Not applicable                                |
| Crystalline silica, quartz | 14808-60-7 | 0 - 1%   | 0.025 mg/m <sup>3</sup> | 10 mg/m <sup>3</sup><br>%SiO <sub>2</sub> + 2 |
| Polyalkylene glycol        |            | 1 - 5%   | Not applicable          | Not applicable                                |

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

**3. HAZARDS IDENTIFICATION****Hazard Overview****CAUTION! - ACUTE HEALTH HAZARD**

May cause eye, skin, and respiratory irritation. May be harmful if swallowed.

**DANGER! - CHRONIC HEALTH HAZARD**

Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

#### 4. FIRST AID MEASURES

|                    |                                                                                                                                                                     |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inhalation         | If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.                              |
| Skin               | Wash with soap and water. Get medical attention if irritation persists.                                                                                             |
| Eyes               | In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing. |
| Ingestion          | Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.          |
| Notes to Physician | Not Applicable                                                                                                                                                      |

#### 5. FIRE FIGHTING MEASURES

|                                                |                                                                                                                |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Flash Point/Range (F):                         | Not Determined                                                                                                 |
| Flash Point/Range (C):                         | Not Determined                                                                                                 |
| Flash Point Method:                            | Not Determined                                                                                                 |
| Autoignition Temperature (F):                  | Not Determined                                                                                                 |
| Autoignition Temperature (C):                  | Not Determined                                                                                                 |
| Flammability Limits in Air - Lower (%):        | Not Determined                                                                                                 |
| Flammability Limits in Air - Upper (%):        | Not Determined                                                                                                 |
| Fire Extinguishing Media                       | Water fog, carbon dioxide, foam, dry chemical.                                                                 |
| Special Exposure Hazards                       | Decomposition in fire may produce toxic gases.                                                                 |
| Special Protective Equipment for Fire-Fighters | Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel. |
| NFPA Ratings:                                  | Health 1, Flammability 0, Reactivity 0                                                                         |
| HMIS Ratings:                                  | Health 1*, Flammability 0, Reactivity 0                                                                        |

#### 6. ACCIDENTAL RELEASE MEASURES

|                                      |                                                                                                                |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Personal Precautionary Measures      | Use appropriate protective equipment.                                                                          |
| Environmental Precautionary Measures | Prevent from entering sewers, waterways, or low areas.                                                         |
| Procedure for Cleaning / Absorption  | Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove. |

#### 7. HANDLING AND STORAGE

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Handling Precautions | Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet. |
| Storage Information  | Store in a cool, dry location.                                                                                                                                                                                                                                                                                                                                                                                                               |

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

|                               |                                                                                                                                                                                              |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Engineering Controls</b>   | Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.                                                |
| <b>Respiratory Protection</b> | Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.                                                                                          |
| <b>Hand Protection</b>        | Impervious rubber gloves.                                                                                                                                                                    |
| <b>Skin Protection</b>        | Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing. |
| <b>Eye Protection</b>         | Wear safety glasses or goggles to protect against exposure.                                                                                                                                  |
| <b>Other Precautions</b>      | Eyewash fountains and safety showers must be easily accessible.                                                                                                                              |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

|                                                   |                   |
|---------------------------------------------------|-------------------|
| <b>Physical State:</b>                            | Liquid            |
| <b>Color:</b>                                     | Brown             |
| <b>Odor:</b>                                      | Odorless          |
| <b>pH:</b>                                        | Not Determined    |
| <b>Specific Gravity @ 20 C (Water=1):</b>         | Not Determined    |
| <b>Density @ 20 C (lbs./gallon):</b>              | Not Determined    |
| <b>Bulk Density @ 20 C (lbs/ft3):</b>             | Not Determined    |
| <b>Boiling Point/Range (F):</b>                   | Not Determined    |
| <b>Boiling Point/Range (C):</b>                   | Not Determined    |
| <b>Freezing Point/Range (F):</b>                  | Not Determined    |
| <b>Freezing Point/Range (C):</b>                  | Not Determined    |
| <b>Vapor Pressure @ 20 C (mmHg):</b>              | Not Determined    |
| <b>Vapor Density (Air=1):</b>                     | Not Determined    |
| <b>Percent Volatiles:</b>                         | Not Determined    |
| <b>Evaporation Rate (Butyl Acetate=1):</b>        | Not Determined    |
| <b>Solubility in Water (g/100ml):</b>             | Partially soluble |
| <b>Solubility in Solvents (g/100ml):</b>          | Not Determined    |
| <b>VOCs (lbs./gallon):</b>                        | Not Determined    |
| <b>Viscosity, Dynamic @ 20 C (centipoise):</b>    | Not Determined    |
| <b>Viscosity, Kinematic @ 20 C (centistokes):</b> | Not Determined    |
| <b>Partition Coefficient/n-Octanol/Water:</b>     | Not Determined    |
| <b>Molecular Weight (g/mole):</b>                 | Not Determined    |

## 10. STABILITY AND REACTIVITY

|                                             |                                                                                                                                            |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Stability Data:</b>                      | Stable                                                                                                                                     |
| <b>Hazardous Polymerization:</b>            | Will Not Occur                                                                                                                             |
| <b>Conditions to Avoid</b>                  | None known.                                                                                                                                |
| <b>Incompatibility (Materials to Avoid)</b> | Hydrofluoric acid.                                                                                                                         |
| <b>Hazardous Decomposition Products</b>     | Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C). |
| <b>Additional Guidelines</b>                | Not Applicable                                                                                                                             |

## 11. TOXICOLOGICAL INFORMATION

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Principle Route of Exposure</b>     | Eye or skin contact, inhalation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Inhalation</b>                      | <p>Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).</p> <p>Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Skin Contact</b>                    | May cause skin irritation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Eye Contact</b>                     | May cause eye irritation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Ingestion</b>                       | Irritation of the mouth, throat, and stomach. May produce nervous system effects such as feeling of weakness, unsteady walk, and dilation of blood vessels. May affect the heart and cardiovascular system.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Aggravated Medical Conditions</b>   | Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Chronic Effects/Carcinogenicity</b> | <p><b>Silicosis:</b> Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.</p> <p><b>Cancer Status:</b> The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to <u>IARC Monograph 68, Silica, Some Silicates and Organic Fibres</u> (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).</p> <p>There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.</p> <p>Prolonged inhalation of fine barium sulfate dusts form harmless nodular granules in lung, an affliction called baritosis. Baritosis produces no symptoms of bronchitis or emphysema, and lung functioning is not affected although dyspnea, upon exertion, may occur. The nodulation disappears if exposure is stopped.</p> |
| <b>Other Information</b>               | For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Toxicity Tests</b>                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Oral Toxicity:</b>                  | Not determined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|                                               |                                                                                           |
|-----------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>Dermal Toxicity:</b>                       | Not determined                                                                            |
| <b>Inhalation Toxicity:</b>                   | Not determined                                                                            |
| <b>Primary Irritation Effect:</b>             | Not determined                                                                            |
| <b>Carcinogenicity</b>                        | Refer to <u>IARC Monograph 68, Silica, Some Silicates and Organic Fibres</u> (June 1997). |
| <b>Genotoxicity:</b>                          | Not determined                                                                            |
| <b>Reproductive / Developmental Toxicity:</b> | Not determined                                                                            |

## 12. ECOLOGICAL INFORMATION

|                                  |                |
|----------------------------------|----------------|
| <b>Mobility (Water/Soil/Air)</b> | Not determined |
| <b>Persistence/Degradability</b> | Not determined |
| <b>Bio-accumulation</b>          | Not determined |

### Ecotoxicological Information

|                                    |                |
|------------------------------------|----------------|
| <b>Acute Fish Toxicity:</b>        | Not determined |
| <b>Acute Crustaceans Toxicity:</b> | Not determined |
| <b>Acute Algae Toxicity:</b>       | Not determined |

|                                  |                |
|----------------------------------|----------------|
| <b>Chemical Fate Information</b> | Not determined |
| <b>Other Information</b>         | Not applicable |

## 13. DISPOSAL CONSIDERATIONS

|                               |                                                                                   |
|-------------------------------|-----------------------------------------------------------------------------------|
| <b>Disposal Method</b>        | Disposal should be made in accordance with federal, state, and local regulations. |
| <b>Contaminated Packaging</b> | Follow all applicable national or local regulations.                              |

## 14. TRANSPORT INFORMATION

### Land Transportation

**DOT**  
Not restricted

**Canadian TDG**  
Not restricted

**ADR**  
Not restricted

### Air Transportation

**ICAO/IATA**  
Not restricted

### Sea Transportation

**IMDG**

Not restricted

**Other Transportation Information**

Labels: None

**15. REGULATORY INFORMATION****US Regulations**

|                                                          |                                                                                                                                      |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>US TSCA Inventory</b>                                 | All components listed on inventory or are exempt.                                                                                    |
| <b>EPA SARA Title III Extremely Hazardous Substances</b> | Not applicable                                                                                                                       |
| <b>EPA SARA (311,312) Hazard Class</b>                   | Acute Health Hazard<br>Chronic Health Hazard                                                                                         |
| <b>EPA SARA (313) Chemicals</b>                          | This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372). |
| <b>EPA CERCLA/Superfund Reportable Spill Quantity</b>    | Not applicable.                                                                                                                      |
| <b>EPA RCRA Hazardous Waste Classification</b>           | If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.                             |
| <b>California Proposition 65</b>                         | The California Proposition 65 regulations apply to this product.                                                                     |
| <b>MA Right-to-Know Law</b>                              | One or more components listed.                                                                                                       |
| <b>NJ Right-to-Know Law</b>                              | One or more components listed.                                                                                                       |
| <b>PA Right-to-Know Law</b>                              | One or more components listed.                                                                                                       |

**Canadian Regulations**

|                               |                                                   |
|-------------------------------|---------------------------------------------------|
| <b>Canadian DSL Inventory</b> | All components listed on inventory or are exempt. |
| <b>WHMIS Hazard Class</b>     | D2A Very Toxic Materials<br>Crystalline silica    |

**16. OTHER INFORMATION****The following sections have been revised since the last issue of this MSDS**

Not applicable

**Additional Information** For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**\*\*\*END OF MSDS\*\*\***