

## HORIZONTAL DIRECTIONAL DRILLING CONTINGENCY PLAN

*If an inadvertent release of drilling fluid is detected, call the Columbia Monitoring Center immediately at 1-800-835-7191.*

### 1.0 INTRODUCTION AND DESCRIPTION OF WORK

Columbia Gas Transmission, LLC (Columbia), a TransCanada Company proposes to construct a new 3.36-mile 8-inch diameter natural gas transmission pipeline equipped with a launcher/receiver at each end of the proposed pipeline. The Eastern Panhandle Expansion (Project) will tie-in to the existing Columbia 1804 and 10240 pipelines in Fulton County, Pennsylvania. The Project is located within three counties and states (Fulton County, Pennsylvania; Washington County, Maryland; and Morgan County, West Virginia).

Columbia is proposing to utilize horizontal directional drilling (HDD) technique for selected crossings located along the Project.

Directional drilling operations have a potential to release drilling fluids, such as bentonite, into the surface environmental through inadvertent returns (a condition where drilling mud is released through a fractured bedrock into the surrounding rock and sand and travels toward the surface). Drilling muds typically consist largely of a bentonite clay-water mixture and are not classified as toxic or hazardous substances. However, if it is released into a waterbody, bentonite has the potential to adversely impact fish and invertebrates. A Safety Data Sheet for bentonite has been included in this Plan as Attachment 1.

All personnel and sub-contractors responsible for the work must adhere to this plan during the directional drilling process.

The specific objectives of this plan are to:

1. Minimize the potential for an inadvertent return of drilling materials associated with directional drilling activities;
2. Provide for the timely detection of inadvertent returns of drilling materials;
3. Protect the environmentally sensitive waterbodies and wetlands within the Project workspace and within the vicinity of the Project workspace;
4. Ensure an organized, timely, and minimum-impact response in the event of an inadvertent return of drilling materials; and
5. Ensure that all appropriate notifications are made immediately to the customer, management and safety personnel.

### 2.0 INADVERTENT RETURN DETECTION

The most obvious signs of an inadvertent return are surface seepage or loss of circulation/pressure of the drilling fluid. One of the functions of the drilling fluid is to seal the hole to maintain the downhole pressure. The loss of the returning fluid is a sign that pressure is not being contained in the drill hole

and surface seepage is occurring outside the hole. If there is a reduction in the quantity of drilling fluid returning to the drilling site (loss of circulation), this could be an initial indication of failure. However, minor loss of drilling fluid is normal in the drilling process. There can be instances during the drilling process when a small layer of loose sand, a small gravel layer or a small rock fracture is encountered. These occurrences will require minimal addition of drilling fluids to fill in the voids. Consequently, a minor drilling fluid loss in and of itself is not an indication of a potential inadvertent release condition. It is the loss of drilling fluid in combination with other factors, which may indicate a potential inadvertent release condition. For example, if there is a loss of drilling fluid and the return of cuttings do not show a large quantity of gravel that could indicate a loss of containment pressure within the hole.

Drilling pressures shall be closely monitored so they do not exceed those needed to penetrate formation. Pressure levels shall be monitored randomly by the Operator. Pressure levels shall be set at a minimum level to prevent inadvertent returns. Cutters and reamers will also be pulled back into previously-drilled sections after each new joint of pipe is added.

Drilling operations will be halted by the drill rig operators immediately upon detection of a drop in drilling pressure or other evidence of an inadvertent return. The clean-up of all spills shall begin immediately. Management and safety departments shall be notified immediately of any spills and shall be consulted regarding clean-up procedures. A spill kit shall be on-site and used if an inadvertent return occurs. Containment materials, such as straw bales, shall also be on-site prior to and during all operations.

Columbia must only use firms who specialize in HDD to perform the proposed stream and wetland crossings. Columbia is responsible for the supervision of the drilling contractor and retains the right to shut down operations.

In an effort to minimize the overall impacts of an in-stream response to an inadvertent return, Columbia will schedule all drilling efforts beneath the Potomac River (S10) and Little Tonoloway Creek (S2) outside of the March 1 through June 15 time of year restriction.

Columbia will provide on-site visual monitoring of the construction area during construction operations and will provide a designated environmental inspector (EI). Columbia's designated EI shall walk the construction area at least every four hours during drilling operations where access is permissible to visually monitor for inadvertent releases. Additionally, Columbia will ensure a vacuum truck shall be staged at the HDD work pad. The vacuum truck would be mobilized immediately upon the discovery of an inadvertent return event.

## **2.1 GENERAL CORRECTIVE ACTION**

Once an inadvertent return is detected, the drilling crew shall take immediate corrective action. The only pressure causing the inadvertent return to occur is the pressure from the drilling fluid pumps. Therefore, the most immediate direct corrective action is:

- To stop the drilling fluid pumps or decrease the pressure (by stopping the pumps or decreasing the pressure, the pressure in the hole will quickly bleed off. With no/reduced pressure in the hole, the inadvertent return will stop or decrease significantly).
- As soon as an inadvertent return is detected, the circulation of mud will only be stopped or reduced temporarily until the response process has been initiated. Once the response/containment process (Sections 2.1.1, 2.1.2 and 2.2) has been initiated and is under control, the drilling activities will resume.

There is greater potential for an inadvertent return is at the entry and exit locations. In the contingency planning for the pipeline crossing, inadvertent returns at the entry and exit locations have been considered and the following preventive actions have been developed:

- The entry and exit locations on all directionally drilled crossings shall have dry (upland) land segments where an inadvertent return can be easily detected, contained, and remediated.
- To isolate and contain a potential inadvertent return at each of the drill sites, there must be a berm around the downslope side of the drilling rig set-up area. Hay bales or silt fence must be part of the berm on the resource side of the drilling area (see appropriate Erosion and Sediment Control Plans).
- A spill kit will be on site and utilized if an inadvertent return should occur.
- If necessary, barriers (such as straw bales or sedimentation fences) between the bore site and the edge of the water source shall be constructed prior to drilling, to prevent released bentonite material from reaching the water.

**2.1.1** In the event of an inadvertent return in an Upland Area, the following corrective actions will be taken immediately:

- The source/pumps will be stopped temporarily or the pressure will be decreased.
- The inadvertent return will be contained immediately by installing hay bales or silt fence and/or constructing dikes or pits.
- The drilling fluid will be removed from the ground surface to the greatest extent possible and removed from the site using manual equipment such as shovels and wheel barrows or earth-moving equipment such as backhoes or small bulldozers, portable pumps and/or vacuum trucks.
- The affected areas will be restored within 30 days as closely as possible to their previous condition.

- Documentation must be made and maintained by the contractor and provided to Columbia.
- The Contractor must follow any special instructions from Columbia's EIs.

**2.1.2** In the event of an inadvertent return into wetlands and/or waterbodies, the containment and corrective actions described below must be taken immediately and the Contractor must make the appropriate contacts in accordance with Section 2.2 below.

- The source/pumps will be stopped temporarily or the pressure will be decreased.
- The inadvertent return will be contained immediately by installing hay bales or silt fence and/or constructing dikes or pits (do not construct earthen dikes or berms within wetland or stream areas).
- The drilling fluid will be removed from the ground surface and from the site to the greatest extent possible by manual means such as by use of shovels, wheelbarrows and/or vacuum hoses. Earth moving equipment such as backhoes or small bulldozers will be used only if manual means prove to be impractical and only after appropriate measures have been taken to minimize impacts to the resource. These measures will be authorized by Columbia's EI.
- The affected areas will be restored as closely as possible to their previous condition.
- Documentation must be made and maintained by the contractor and provided to Columbia's EI.
- The Contractor must follow any special instructions from Columbia's EI.

Typically, drilling activities will not be suspended unless the inadvertent return creates a threat to public health and safety or unless suspended by Columbia or a regulatory agency.

## **2.2 Response and Reporting Personnel**

If an inadvertent return of drilling fluids is detected, the drilling contractor will immediately notify Columbia's EI and Chief Inspector. The EI has been given "stop work authority" by Columbia and his/her instructions must be followed.

### **Chief Inspector/EI Responsibilities:**

The Chief Inspector and/or EI have overall responsibility for implementing this Plan. The Chief Inspector/EI will ensure that all employees are trained prior to drilling activities. The Columbia U.S. Environmental Planning and Permitting Principal shall be notified immediately when an inadvertent return is detected. They will be responsible for ensuring Columbia's environmental health department is aware of the inadvertent return, coordinating appropriate personnel, response, cleanup, regulatory



agency notification and coordination to ensure proper clean-up, disposal of recovered material and timely reporting of the incident. They shall ensure waste materials are properly containerized, labeled, and removed from the site to an approved disposal facility by personnel experienced in the removal, transport and disposal of drilling mud.

The Chief Inspector and/or EI shall be familiar with all aspects of the drilling activity, the contents of this Plan, and the conditions of approval under which the activity is permitted to take place. They shall have stop work authority and commit the resources (personnel and equipment) necessary to implement this Plan. They shall assure that a copy of this Plan is available (onsite) and accessible to all construction personnel. They shall ensure that all workers are properly trained and familiar with the necessary procedures for response to an inadvertent return, prior to commencement of drilling operations.

### **2.3 Training**

Prior to the commencement of drilling activities, the Chief Inspector and/or Columbia's EI shall ensure that the contractors receive training in the following:

- The provisions of this Plan, equipment maintenance and site-specific permit and monitoring requirements;
- Inspection procedures for release prevention and containment equipment and materials;
- Contractor obligation to immediately stop the drilling operation upon first evidence of the occurrence of an inadvertent return and to immediately report any releases;
- Contractor responsibilities in the event of an inadvertent return of drilling materials;
- Operation of release prevention and control equipment and the location of release control materials, as necessary and appropriate; and
- Protocols for communication with agency representatives who maybe on-site during the clean-up effort.

The Chief Inspector and/or Columbia's EI shall ensure that a job briefing meeting is held at the start of each day of drilling to review the appropriate procedures to be followed in case of an inadvertent return or to advise new hires. Questions will be answered and clarification given on any point over which the drilling crew or other Project staff has concerns.

### **2.4 Response Equipment**

The drilling contractor will be responsible for having all response materials and equipment required for containment and remediation of an inadvertent return. Such materials must be stored within the drilling sites.

The materials should include at a minimum: lumber for temporary shoring, equipment mats, sand, portable pumps, hand tools, and hay bales and silt fence. The drilling contractor will also have heavy equipment such as backhoes available, which can be utilized to control and clean up large inadvertent returns.

The Chief Inspector and/or Columbia's EI shall ensure that:

- All equipment and vehicles are checked and maintained daily to prevent leaks of hazardous materials;
- Spill kits and spill containment materials are available on-site at all times and that the equipment is in good, working order;
- Equipment required to contain and clean up an inadvertent return release will either be available at the work site or readily available at an offsite location within a reasonable distance from the drilling activities; and
- If equipment is required to be operated near a waterbody, absorbent pads and/or secondary containment structures shall be used as necessary to protect the waterbody or wetland from engine fluids.

## **2.5 Follow-Up**

After the inadvertent return, has been contained, the drilling contractor and Columbia will make every effort to determine the root cause of the inadvertent return. Columbia will amend the HDD procedures to control the factors which caused the inadvertent return and to minimize the chance of recurrence. Developing the corrective measure will be the joint effort of Columbia and the drilling contractor.

In some cases, the corrective measure may involve a determination that the existing hole encountered a void, which could be bypassed with a slight change in profile. In other cases, it may be determined that the existing hole encountered a zone of unsatisfactory soil material and the hole may have to be abandoned. Any such activity must be documented by the contractor and Columbia.

### **2.5.1 Response Close-out Procedures**

When the release has been contained and cleaned up, response closeout activities will be conducted at the direction of the Chief Inspector/ Columbia's EI and shall include the following:

- The recovered drilling fluid will either be recycled or hauled to an approved facility for disposal. No recovered drilling fluids will be discharged into streams, storm drains or any other water source;
- All inadvertent return excavation and clean-up sites will be returned to pre-construction contours using clean fill, as necessary; and
- All containment measures (fiber rolls, straw bales, etc) will be removed, unless otherwise specified by the Chief Inspector and/or Columbia's EI.

### **2.5.2 Construction Restart**

For small releases not requiring external notification, drilling may continue if 100 percent containment has been achieved through the use of a leak stopping compound or redirection of the bore and the clean up crew remains at the site throughout the construction period.

For releases requiring external notification related to an inadvertent release of drilling mud, construction will not restart without prior approval.

### **3.0 NOTIFICATION**

In the event of an inadvertent return that reaches a water source, the Chief Inspector and/or Columbia's EI will notify the Columbia U.S. Environmental Planning and Permitting Principal so they can notify the appropriate resource agencies. All agency notifications will occur within 24 hours and proper documentation will be accomplished in a timely and complete manner. The following information will be provided:

- Name and telephone number of person reporting;
- Location of the release;
- Date and time of the release;
- Type and quantity, estimated size of release;
- How the release occurred;
- The type of activity that was occurring around the area of the release;
- Description of any sensitive areas, and their location in relation to the release;
- Description of the methods used to clean up or secure the site; and
- Listing of the current permits obtained for the Project.

#### **3.1 Communicating with Regulatory Agency Personnel**

All employees and contractors will adhere to the following protocols when permitting Regulatory Agency Personnel arrive on site. Regulatory Agency personnel will be required to comply with appropriate safety rules. Only the Columbia U.S. Environmental Planning and Permitting Principal or their designated EI are to coordinate communication with Regulatory Agency personnel.

### **4.0 Drill Failure**

In addition to inadvertent return concerns, there is also a potential for failure of the drilling apparatus. If the drilling apparatus becomes inextricably lodged, and cannot be withdrawn without exiting the construction work limits (unless the appropriate approvals are first obtained by the Columbia's Environmental Planning and Permitting Department), or damaging the resource(s) the directional drill was performed to protect, the apparatus and hole will be abandoned. If the hole is abandoned, it will be filled with HDD cuttings and drilling fluid. Once the abandoned hole is filled, a second attempt will be made to complete the drill. The second attempt must be performed within the confines of the approved construction work limits as shown on the Environmental Construction Drawings. The second attempt will generally be offset slightly from the original entry-hole location.



# **Attachment 1**

## **Material Data Safety Sheet for Bentonite (Drilling Fluid)**







# MATERIAL SAFETY DATA SHEET

**Product Trade Name:** **BARA-KADE® BENTONITE**

**Revision Date:** 31-Mar-2005

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product Trade Name:** BARA-KADE® BENTONITE

**Synonyms:** None

**Chemical Family:** Mineral

**Application:** Additive

**Manufacturer/Supplier:** BPM Minerals LLC  
3000 N Sam Houston Parkway East  
Houston, TX 77032

Telephone: (281) 871-7900

Fax: (281) 871-7940

Emergency Telephone: (800) 666-9260 or (713) 753-3000

**Prepared By:** Chemical Compliance  
Telephone: 1-580-251-4335

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Crystalline silica, cristobalite	14464-46-1	0 - 1%	0.05 mg/m <sup>3</sup>	1/2 x 10 mg/m <sup>3</sup> %SiO <sub>2</sub> + 2
Crystalline silica, tridymite	15468-32-3	0 - 1%	0.05 mg/m <sup>3</sup>	1/2 x 10 mg/m <sup>3</sup> %SiO <sub>2</sub> + 2
Crystalline silica, quartz	14808-60-7	1 - 5%	0.05 mg/m <sup>3</sup>	10 mg/m <sup>3</sup> %SiO <sub>2</sub> + 2
Bentonite	1302-78-9	60 - 100%	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 and respiratory irritation.

**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**

<b>Inhalation</b>	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
<b>Skin</b>	Wash with soap and water. Get medical attention if irritation persists.
<b>Eyes</b>	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
<b>Ingestion</b>	Under normal conditions, first aid procedures are not required.
<b>Notes to Physician</b>	Treat symptomatically.

**5. FIRE FIGHTING MEASURES**

<b>Flash Point/Range (F):</b>	Not Determined
<b>Flash Point/Range (C):</b>	Not Determined
<b>Flash Point Method:</b>	Not Determined
<b>Autoignition Temperature (F):</b>	Not Determined
<b>Autoignition Temperature (C):</b>	Not Determined
<b>Flammability Limits in Air - Lower (%):</b>	Not Determined
<b>Flammability Limits in Air - Upper (%):</b>	Not Determined

**Fire Extinguishing Media** All standard firefighting media.

**Special Exposure Hazards** Not applicable.

**Special Protective Equipment for Fire-Fighters** Not applicable.

**NFPA Ratings:** Health 0, Flammability 0, Reactivity 0  
**HMIS Ratings:** Flammability 0, Reactivity 0, Health 0\*

**6. ACCIDENTAL RELEASE MEASURES**

**Personal Precautionary Measures** Use appropriate protective equipment. Avoid creating and breathing dust.

**Environmental Precautionary Measures** None known.

**Procedure for Cleaning / Absorption** Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

## 7. HANDLING AND STORAGE

<b>Handling Precautions</b>	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.
<b>Storage Information</b>	Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container.

## 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>	Normal work 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>	None known.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State:</b>	Solid
<b>Color:</b>	Various
<b>Odor:</b>	Odorless
<b>pH:</b>	8-10
<b>Specific Gravity @ 20 C (Water=1):</b>	2.65
<b>Density @ 20 C (lbs./gallon):</b>	Not Determined
<b>Bulk Density @ 20 C (lbs./ft<sup>3</sup>):</b>	50-70
<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>	Insoluble
<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 (centistrokes):</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 anticipated
<b>Incompatibility (Materials to Avoid)</b>	Hydrofluoric acid.
<b>Hazardous Decomposition Products</b>	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 mechanical skin irritation.
<b>Eye Contact</b>	May cause eye irritation.
<b>Ingestion</b>	None known
<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>

**Other Information**

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).

**Toxicity Tests**

<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>	TLM96: 10000 ppm (Oncorhynchus mykiss)
<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>	Bury in a licensed landfill according to 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 Shipping Information

Labels: None

## 15. REGULATORY INFORMATION

### US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.
<b>Canadian Regulations</b>	
Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials (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\*\*\***





# SAFETY DATA SHEET

Product Code: AB3A005 (BENTONITE)  
Updated: 12/23/14

## SECTION 1: IDENTIFICATION

**PRODUCT NAME(s):** Swell Clay, Pond Seal, Conditioner

**GENERIC NAME:** Bentonite **MSDS CODE NO.** A202PABA005

**SYNONYMS:** Calcium Bentonite, Sodium Bentonite, Montmorillonite, Smectite Clay

**CHEMICAL NAME:** Sodium / Calcium Aluminum Silicate **CASE REGISTRY NO.** 1302-78-9

**MANUFACTURING ADDRESS:** Western Clay Company  
620 East SR 24  
Aurora, UT 84620 **CONTACT NUMBERS:** Emergency: 435-657-3605  
Redmond Minerals: 435-529-7402

**DISTRIBUTOR ADDRESS:** Redmond Minerals, Inc.  
2725 North 100 West  
Redmond, UT 84652

**RECOMMENDED USE:** Bentonite has a variety of uses. It can be used as a rheology modifier, binding agent, absorbent, filler and other i.e. for applications like: foundry, iron ore agglomeration, drilling, construction - civil engineering, filtration (i.e. oil, wine, beer), pharmaceutical and cosmetics, cat litter, food processing aids and feed additives.

**USE RESTRICTIONS:** There are no identified uses advised against.

## SECTION 2: HAZARD IDENTIFICATION

**GHS CLASSIFICATION** Signal: Danger  
Causes damage to the lungs through prolonged or repeated exposure if inhaled



**HEALTH/PHYSICAL HAZARDS:** Material dusts containing less than 1% free crystalline silica (quartz) are classified as nuisance particulates. Exposure to these dusts may cause irritation to eyes, ears, throat, and upper respiratory tract. This material's dust may contain more than 1% free silica as Quartz. Chronic (long term) exposure to air born free silica at levels higher than TLV=s may lead to the development of silicosis or other respiratory problems. (See Section VI)

**HAZARD LISTING:** Nuisance Particles are listed by ACGIH. Free Crystalline Silica as Quartz is listed by OSHA and ACGIH as a Hazardous Material.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCES:	CAS #	Percent (w/w)
Bentonite	1302-78-9	80-100%
Crystalline silica, quartz	14808-60-7	0-5%
Crystalline silica, cristobalite	14464-46-1	0-1%
Crystalline silica, tridymite	15468-32-3	0-1%
Water	7732-18-5	8-12%

## SECTION 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, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

**INGESTION:** Under normal conditions, first aid procedures are not required.

NOTES TO PHYSICIAN: Treat symptomatically.

### SECTION 5: FIRE-FIGHTING MEASURES

FLASH POINT RANGE:	Non-flammable Silicate Mineral	FLAMMABLE LIMITS:	LEL: NA UEL:NA
FIRE EXTINGUISHING MEDIA:	All standard firefighting media	SPECIAL EXPOSURE HAZARDS:	Not Applicable
NFPA RATINGS:	Health 0, Flammability 0, Reactivity 0	HMIS RATINGS:	Health 0*, Flammability 0, Reactivity 0, PPE: At
SPECIAL FIRE FIGHTING PROCEDURES:	Not applicable		

### SECTION 6: ACCIDENTAL RELEASE MEASURES

MATERIAL SPILL OR RELEASE: Avoid breathing dust; wear respirator approved for silica veering dust. Vacuum up to avoid generating airborne dust. Avoid using water. Product is slippery when wet.

WASTE DISPOSAL METHOD: Product should be disposed of in accordance with applicable local, state, and federal regulations. There are no known environmental precautionary measures. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage, and disposal.

### SECTION 7: HANDLING AND STORAGE

HANDLING PRECAUTIONS: This product contains quartz, cristobalite, and/or tridymite which may become airborne without a viable cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposer limits below permissible limits. Material is slippery when wet.

STORAGE INFORMATION: Do not reuse empty container. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Keep from excessive heat.

### SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

VENTILATION REQUIREMENTS: Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in section VI.

RESPIRATOR: Use respirator approved by NIOSH/MSHA for silica bearing dust.

EYE PROTECTION: Use safety glasses or goggles to protect against exposure.

HAND PROTECTION: Normal work gloves.

SKIN PROTECTION: 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.

OTHER PPE: None known.

### SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	powder	COLOR:	Tan, Light Green, Red
BULKING VALUE:	90 lbs.	DENSITY:	70 lb/ft <sup>3</sup> powder or compact granular
MELTING POINT:	1450 °C	pH:	8-10
SOLUBILITY IN WATER:	Insoluble, Forms Colloidal Suspension	ODOR:	Mild earthy

### SECTION 10: STABILITY AND REACTIVITY

STABILITY:	Stable	HAZARDOUS POLYMERIZATION:	None
INCOMPATIBILITY:	None	HAZARDOUS DECOMPOSITION PRODUCTS:	None



## SECTION 11: TOXICOLOGICAL INFORMATION

<b>TOXICITY TESTS:</b>	Oral	ND	Genotoxicity	ND
	Dermal	ND	Reproductive	ND
	Inhalation	ND	Primary Irritation Effect	ND

**PRINCIPLE ROUTE OF EXPOSURE:** Eye or skin contact, inhalation

**SKIN:** Possible drying resulting in dermatitis

**EYES:** Mechanical irritant

**INGESTION:** Accidentally this material will generally cause no adverse effects. Minor intestinal irritation is possible.

**INHALATION:** (Acute, Short Term) Exposure to excessive concentrations of dust may cause irritation of the Nose, Throat, and Upper Respiratory Tract. (Chronic, Long Term) Chronic exposure to crystalline silica such as quartz where levels exceed TLV-<sub>s</sub> can cause Silicosis and other respiratory problems. Short term exposure to very high concentrations may lead to increased risk and accelerated onset of silicosis and respiratory damage. Silicosis is a progressive, degenerative, disabling, and sometimes fatal lung disease characterized by coughing, shortness of breath, wheezing, and fibrotic changes in the lungs with scarring and nodular formation.

<b>PERMISSIBLE EXPOSURE LIMITS:</b> (For air contaminants 8 hour TWA)	Bentonite as Nuisance Dust	OSHA PEL	ACGIH TLV
	Total Dust	15mg/m <sup>3</sup>	Not determined
	Respirable Dust	5mg/m <sup>3</sup>	Not determined
	Crystalline Quartz (respirable)	0.1mg/m <sup>3</sup>	0.1mg/m <sup>3</sup>

**CARCINOGENICITY:**

Bentonite is not listed by NTP, IARC, or OSHA. 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, and experimental evidence that tridymite as a carcinogen in animals. The National Toxicology Program (NTP) classifies respirable crystalline silica as "Known to be a human carcinogen"

## SECTION 12: ECOLOGICAL INFORMATION

<b>MOBILITY (water/soil/air):</b>	ND	<b>FISH TOXICITY:</b>	TLM96: 10000 ppm (Oncorhynchus mykiss)
<b>PERSISTENCE/DEGRADABILITY:</b>	ND	<b>CRUSTACEANS TOXICITY:</b>	ND
<b>BIO-ACCUMULATION:</b>	ND	<b>ALGAE TOXICITY:</b>	ND
<b>CHEMICAL FATE INFORMATION:</b>	ND	<b>OTHER INFORMATION:</b>	ND

## SECTION 13: DISPOSAL CONSIDERATIONS

**DISPOSAL METHOD:** Product should be disposed of in accordance with applicable local, state, and federal regulations. There are no known environmental precautionary measures. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage, and disposal.

## SECTION 14: TRANSPORTATION INFORMATION

<b>SHIPPING NAME:</b>	Common Ground Clay (NOIBK)	<b>HAZARD CLASS:</b>	Not Hazardous	<b>CAUTIONARY LABELING:</b>	None required
<b>LAND TRANSPORTATION RESTRICTIONS:</b>	DOT: Not Restricted	<b>CANADIAN TDG:</b>	Not Restricted	<b>ADR:</b>	Not Restricted
<b>AIR TRANSPORTATION RESTRICTIONS:</b>	ICAO / IATA: Not Restricted				
<b>SEA TRANSPORTATION RESTRICTIONS:</b>	IMDG: Not Restricted				

## SECTION 15: REGULATORY INFORMATION

### U.S. REGULATIONS:

US TSCA Inventory  
EPA SARA Title III Extremely Hazardous Substances  
EPA SARA (311, 312) Hazard Class  
EPA SARA (313) Chemicals  
EPA CERCLA/Superfund Reportable Spill Quantity  
EPA RCRA Hazardous Waste Classification  
California Proposition 65  
MA Right-to-Know Law  
NJ Right-to-Know Law  
PA Right-to-Know Law

All components listed on inventory or are exempt.  
Not applicable  
Acute Health Hazard, Chronic Health Hazard  
This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372)  
Not applicable  
If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA  
The California Proposition 65 regulations apply to this product.  
One or more components listed.  
One or more components listed.  
One or more components listed.

### CANADIAN REGULATIONS:

Canadian DSL Inventory  
WHMIS Hazard Class

All components listed on inventory.  
D2A Very Toxic Materials Crystalline Silica

## SECTION 16: OTHER INFORMATION

### ADDITIONAL INFORMATION:

This SDS was updated on 12/23/14. For additional information on the use of this product, or for questions about the Safety Data Sheet for this or other Redmond Minerals, INC. products, please contact:



**Redmond Minerals, INC.**

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