

**Bill Barrett Corporation**  
**Land Application of Water-Based Bentonitic**  
**Drilling Fluids & Associated Drill Cuttings**  
**CB Rudd 6-61-18**

This document outlines the operational practices that will be employed when applying water-based bentonitic drilling fluids and associated drill cuttings via land application at the above referenced location. These practices will be employed to maintain compliance with the Colorado Oil and Gas Conservation Commission (COGCC) Rule 907.d.(3) and COGCC Policy on Drill Cuttings Management dated September 15, 2014. These materials are applied as a beneficial soil amendment.

Only water-based bentonitic drilling fluids and drill cuttings generated by Bill Barrett Corporation (BBC) during the drilling of wells at the CB Rudd pad will be applied at this site. No other E&P waste shall be deposited at this site. The plan detailed below follows the COGCC Land Application Plan Checklist, which is included as Attachment 1.

**Disposal Location Information**

1. Facility entrance is located at 40.495138, -104.257473.
2. A map illustrating the location of the facility and nearby surface water features (if present) is included as an attachment.
3. The land use is non-crop rangeland: After drilling operations are completed and the pad is reclaimed the land surrounding the production facility will be returned to non-crop rangeland.
4. The native soil, a sandy loam, will have the added benefit of increased clay content. When the site is re-vegetated the soil will retain more moisture, which will better support the re-seeding of Native Sandy soil mix. The site will also have an increased resistance to wind erosion.
5. The proposed land application site is being considered a sensitive area due to the proximity to the nearest building unit which is owned by BBC. Depth to groundwater is estimated to be greater than 15 feet and the soil type is Olney fine sandy loam. The mud and associated cuttings will be incorporated onsite and mixed until soil concentrations are below table 910-1, thus the risk to migration to groundwater is minimal.

6. The land application facility is not in a mapped Sensitive Wildlife Habitat or Restricted Surface Occupancy as defined by mapped areas on COGCC GIS Online map.
7. Background soil samples have been collected and analyzed for arsenic. No previous oil and gas activities have been conducted onsite, therefore, no baseline hydrocarbon concentrations will be collected.
8. Surface owner of the property is BBC. There is no agreement necessary because surface owner and operator are the same corporation.
9. BBC shall provide access when requested by the COGCC.
10. The site is located in unincorporated Weld County. Land application is consistent with local zoning land use policy.
11. The bentonitic drilling fluid and cuttings will undergo a one-time mixing event. The cuttings will be dried and then thin spread on fill dirt once final grade is established. Cuttings will be then disked in to a depth of approximately 6 inches. Once verification of compliance with Table 910 standards is verified topsoil will be spread and the site will be re-vegetated. Since the activity will not be ongoing there will be no need for signage prohibiting dumping of additional material.
12. The native soil, a sandy loam, will have the added benefit of increased clay content. When the site is re-vegetated the soil will retain more moisture, which will better support the re-seeding of Native Sandy soil mix. The site will also have an increased resistance to wind erosion.

### **Material Volume**

1. Approximately 430 yards of cuttings and bentonitic drilling fluids will be applied on location.

### **Material Handling**

1. The cuttings will be stacked and dried as they come off the rig. Sawdust, EcoSponge, or another solidification/drying product will be utilized. The cuttings will be staged in a bermed storage area prior to incorporation. Upon completion of drilling activities, the mud and cuttings will be thin spread across approximately 8 acres of land that will be reclaimed. An application depth of approximately 0.5 to 1 inch is anticipated based on

the volume of mud and cuttings and the area of reclaim. After application the mud and cuttings will be disked into native and fill material to a depth of approximately 6 inches.

2. The material will be stockpiled onsite in a bermed storage area. The material will be solidified onsite.
3. The volume of material will be documented during drilling activities. The volume will be calculated based on drilling plans and saved by BBC with the well/pad internal records.
4. Solidification will occur as the cuttings and drilling fluids come off the rig. The cuttings will be staged in a bermed area. Upon completion of drilling activities, the mud and cuttings will be thin spread across approximately 8 acres of land that will be reclaimed. An application depth of approximately 0.5 to 1 inch is anticipated based on the volume of mud and cuttings and the area of reclaim. After application the mud and cuttings will be disked into native and fill material to a depth of approximately 6 inches. The entire site will have stormwater controls to ensure no offsite migration of sediment. A water truck will be utilized if dust suppression is needed. The material shall remain stockpiled at the drilling location in an onsite berm until weather permits incorporation without interruption. Pre-application samples will be collected to ensure that Table 910 standards can be met post application.
5. The facility will not receive fluids/cuttings for more than three years. This will be a one-time event following completion of drilling and occurring with pad reclamation.

#### **Post Application Sampling and Closure Requirements**

1. After application and disking of the mud and cuttings, soil samples will be collected from a depth of 0-8 inches bgs. Approximately 4 to 6 samples will be collected in a grid across each acre of reclaimed area. These samples will be composited into a representative sample from each acre of disturbance for a total of 8 samples in aggregate. All soil samples will be analyzed for total petroleum hydrocarbons (TPH), including gasoline range organics (GRO) and diesel range organics (DRO). Soil samples will also be analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX), electrical conductivity (EC), sodium adsorption ratio (SAR), pH, and arsenic. The attached Site Map illustrates proposed soil sample locations.
2. To receive closure BBC shall:
  - Submit a Form 4 to the COGCC
  - Submit sample results and sample map.
  - Verify soils comply with Table 910-1.

- Verify that all cuttings and fluids have been thoroughly incorporated.
- Verify that sediment controls have been removed.
- Verify that the surface owner is satisfied with the final condition of the property.
- Verify that surface reclamation has been performed.

#### Attachments

Figure 1 – Site Location Map

Figure 2 – Site Map

## FIGURES

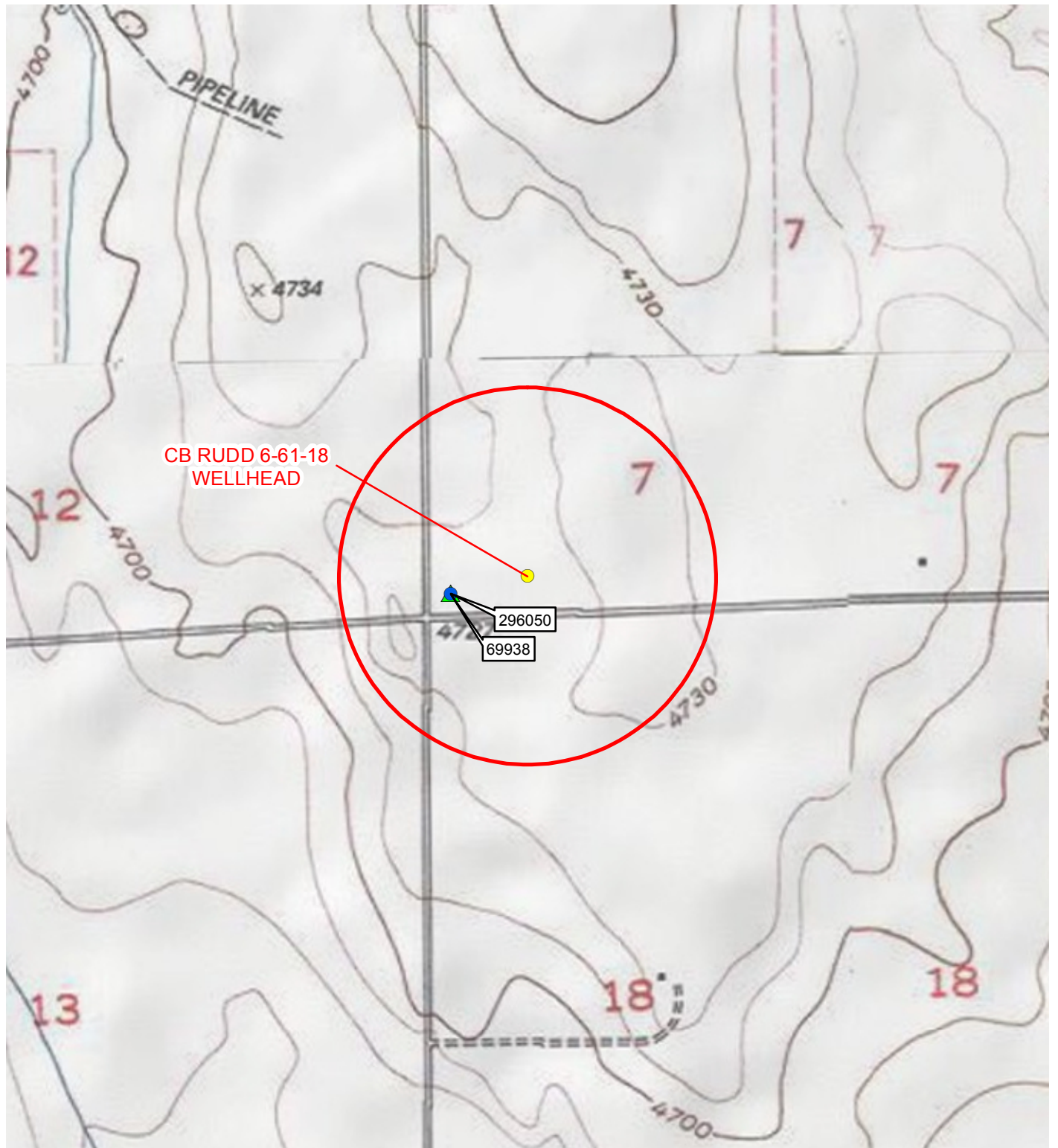
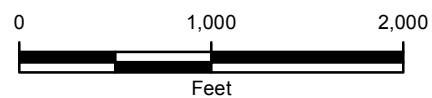
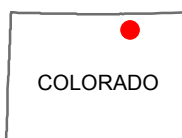


IMAGE COURTESY OF ESRI/USGS

## LEGEND

- WELLHEAD
- DOMESTIC WATER WELL
- ▲ COMMERCIAL WATER WELL
- QUARTER MILE RADIUS



**FIGURE 1**  
**SITE LOCATION MAP**  
**CB RUDD 6-61-18**  
**WELD COUNTY, COLORADO**

**BILL BARRETT CORPORATION**







IMAGE COURTESY OF ESRI

## LEGEND

● PROPOSED SAMPLING LOCATION

● WELLHEAD

▭ LAND APPLICATION AREA

▭ PRODUCTION FACILITY PAD

▭ SECTION

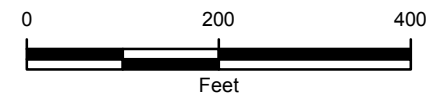


FIGURE 2  
SITE MAP  
CB RUDD 6-61-18  
WELD COUNTY, COLORADO

**BILL BARRETT CORPORATION**

