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# TECHNICAL MEMORANDUM

## Utah Coal Regulatory Program

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May 6, 2010

TO: Internal File

THRU: Steve Christensen, Team Lead *SCC*

FROM: Priscilla W. Burton, CPSSc, Environmental Scientist III *PWB by 8/5*

RE: Degassification Volume -- Add Well G-30, Canyon Fuel Company, Dugout Canyon Mine, C/007/0039, Task ID #3531

### SUMMARY:

Attachment 2-1 of the **Methane Degassification Volume** of the MRP does not contain soil chemistry information for well sites G-25, G-26, G-29 or G-30. This baseline information is part of the soil characterization required by R645-301-223. Soils chemical analysis from sites G-25 and G-26 was to be collected at the time of disturbance and is overdue. A commitment in the plan (p. 1-9) states that soil chemistry information from sites G-29 and G-30 will be collected as soon as the sites become accessible in the spring of 2010.

The application to develop G-30 should be conditional upon receipt of the soil chemical analyses and subsequent review by the division to allow evaluation of proposed soil salvage depth.

**R645-301-223**, The Permittee must sample and analyze soil horizons at the location of G-30-1 and G-30-2 and provide results of analysis to the Division for review and comment.

**R645-301-131**, The soil survey presented in Attachment 2-1 must state the name of the soil scientist conducting the work and the date of collection.

With this amendment, the total disturbed acreage for all degas wells is 41.5 acres (Table 1-2). This figure does not include the 15-acre AMV road and topsoil stockpiles along the AMV road. The MRP itemizes the disturbed acres in the MRP Chap 1, pg 1-9 and in App. 1-4. The total disturbed area increases to 108.7 acres (p. 1-9) with this application.

Attachment 5-2 includes a reclamation record showing that sites G-2 through G-7 and G-13 have been contemporaneously reclaimed as of 2009.

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**TECHNICAL ANALYSIS:**

**ENVIRONMENTAL RESOURCE INFORMATION**

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

**PERMIT AREA**

Regulatory Requirements: 30 CFR 783.12; R645-301-521.

**Analysis:**

With this amendment, the total disturbed acreage for all degas wells is 41.5 acres (Table 1-2). Adding in the 15 acre AMV road and topsoil stockpiles along the road, the total disturbed area for the degas wells is 56.5 acres.

The total disturbed acreage for the mine is recorded as 108.7 acres. The disturbed acreage for gas wells, roads, refuse pile etc, see is listed on Chapter 1 page 1-9 and Appendix 1-4, and on Plate 1-4.

**Findings:**

The information provided meets the requirements of the R645 Rules.

**SOILS RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

**Analysis:**

Appendix 2-2, Volume 1 of the MRP provides a general outlook on the soils of the Book Cliffs in the vicinity of the Dugout Mine. Figure 1-1 and Plate 1-4 (**Methane Degassification Amendment Volume**) shows the location of the degas wells. Table 1-1 provides locations of the wells and Table 1-2 states each well's acreage. With this amendment, the total disturbed acreage for all disturbance associated with the degas wells is 52.5 acres (MRP Chap 1, p. 1-9).  
[6/08/2009]

The specific soils information for degasification well sites G-2 through G-19, and G-22, G-25, G-26 and G-31 is found in Attachment 2-1 (**Methane Degasification Amendment**) of the MRP. (Sites G-1, G-8, G-20, G-21, G-23 and G-24 were not developed.) Attachment 2-1 of the **Methane Degassification Volume** of the MRP does not contain chemical analysis for soils at well sites G-25, G-26, G-29, or G-30. Baseline information from sites G-25 and G-26 was to be collected at the time of disturbance and is overdue.

The G-29-1 well location has changed from the original survey location shown in the site sketch of Attachment 2-1. The new location is now planned for soil type C (rather than A), p. 2-8, Sec. 222.400. The site is located south of Pace Creek east of the Pace Canyon Fan Portal in Sec 29 of T13 S., R.13 E (Table 1.1, Figure 1-1, and Plate 1-4), on Thayn Trust lands (Plate 1-1). The access to G-29 follows an established four wheel drive track that is shown on Attachment 5-4 Plate 4. The G-29 pad location is on a 13% slope at elevation of 8,030 ft. on the north facing, mid-mountain slope (Fig. 2, Attach. 5-1). The well site is expected to disturb an additional 2.0 acres (Table 1-2). The G-29-1 well location has changed from the original survey location shown in the site sketch of Attachment 2-1. The new location is now planned for soil type C (rather than A), p. 2-8, Sec. 222.400. The application states on page 1-9 that soil chemistry information will be collected by soil horizon from sites G-29 and G-30 in the spring of 2010 as soon as the sites become accessible.

Baseline soil chemistry information for soils at sites G-2 through G-7 was collected at the time of disturbance (Attachment 2-1), all subsequent sites were surveyed and soil analyzed prior to disturbance. The following parameters were analyzed: texture (particle size analysis), pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO<sub>3</sub>, plant available Nitrogen, Potassium, and Phosphorus (Section 243). Soil sample analyses are found in Attachment 2-1.

The sites are located at approximately 7,400 to 8,900 ft (see Fig 1-1 and Plate 1.4). The site descriptions, drawings, and photographs are in Attachment 2-1. Some of the sites were previously disturbed by logging (Table 3-1, pg 3-16, Attachment 2-1 section 4.3), previous exploration or road construction (sites G-6, G-9, G-11, G-12, G-14, G-15, G-16, G-17, G-19), or by ranching activity (G-25).

The G-25, G-26, and G-29 well sites are located south of Pace Creek east of the Pace Canyon Fan Portal in Sec 20 and 29 of T13 S., R.13 E (Table 1.1, Figure 1-1, and Plate 1-4), on Thayn Trust lands (Plate 1-1). The access to G-25, G-26, and G-29 follows an established four wheel drive track that is shown on Attachment 5-4 Plate 4. The G-25 pad location is on nearly level ground located an elevation of 8,140 ft. on the north facing, mid-mountain slope (Fig. 2, Attach. 5-1). The G-26 location is ½ mile west at a slightly higher elevation of 8,160 ft. The G-26 location is on a knoll. The G-29 site is located approximately 750 ft. from G-26 above a projected Gilson seam panel, Gil-11. Each well site disturbs approximately two acres (Table 1-2).

Site descriptions, sketches, profiles, and soil analyses are in Attachment 2-1 for the degas well sites. The G-25, G-26 and G-29 sites were surveyed in August 2008, by Robert Long,

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CPSSc. The G-29 soils are categorized as the Whitesage Series, Fine-loamy, mixed, superactive, frigid Aridic Calciustepts, supporting mountain big sagebrush vegetation, with 10 inch topsoil depth and 12 inch subsoil depth.

To allow the Division to have adequate information to provide comment on the topsoil salvage operation, the Permittee must require soil consultants to sample and analyze soils at the time of survey. For example site G-25, baseline soil analysis was not provided with the soil survey. Available (Order III level survey\*\*\*) information suggested that salvage of topsoil was not recommended below the required six inches, based upon general SAR values associated with the clay subsoils. Laboratory analysis of the representative pedon could have provided further insight into that decision. This point was made to the Permittee in July 2009. A soil sample was not taken of site G-25, and will be provided with as-builts (Section 243). Site G-29 will be sampled and analyzed prior to disturbance as soon as the site is accessible in 2010, so that the Division has adequate information to provide comment on the topsoil salvage operation.

\*\*\*Insight into the electrical conductivity and SAR of the G-25 soil horizons was provided by the Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions [Online WWW]. Available URL: <http://soils.usda.gov/technical/classification/osd/index.html>, [accessed June 8, 2009] USDA-NRCS, Lincoln, NE.

The USDA/NRCS website (cited above) places the Whitesage Series in the Upland Loam (Mountain Big Sagebrush) range site. Similar ranges sites such as the Beje and Falcon Series produce 1,500 lbs/ac in a favorable year (1988 Carbon County Soil Survey).

**Findings:**

The application to develop G-30 should be conditional upon receipt of the soil chemical analyses and subsequent review by the division to allow evaluation of proposed soil salvage depth.

**R645-301-223**, The Permittee must sample and analyze soil horizons at the location of G-30-1 and G-30-2 and provide results of analysis to the Division for review and comment.

## **OPERATION PLAN**

### **TOPSOIL AND SUBSOIL**

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

**Analysis:**

**Topsoil Removal and Storage**

Sites G-8 through G-19 and G-31, G-22, G-25, G-26, 29 and G-30:  
[10282008]

Site configurations are provided in Attachment 5-1. Disturbed acreage for each well site is tallied in Table 1-2, with an additional 14 acres disturbed for road construction noted below Table 1-2. Topsoil salvage areas vary from 0.32 acres at site G-6 to 4.7 acres at site G-18 (Table 1-2). Topsoil salvage from 1.6 acres along the access road and pad is reported for site G-22 (App. 2-1, Att. 2-2 September 25, 2008).

Topsoil removal volumes are listed in Table 2-1 and Attachment 2-2. The Permittee has defined the disturbed area at G-29 as 2.0 acres, but expects to disturb only 0.8 acres. The 0.8 acre figure was used for calculating topsoil salvage. Based upon a twelve inch soil salvage depth, the salvage volume for the 0.8 acre site G-29 would be 1,363 cu yds. To be clear, the Division approves of one foot of soil removed from the entire disturbed footprint. This means that if a greater area than 0.8 acres is disturbed, more topsoil will be salvaged and stored than that described in the plan.

The topsoil stockpile dimensions are calculated in Attach 2-2 and reported in Table 2-2 for G-29 as 152 ft. length X 45 ft. width X 10 ft high, with slopes of 2 h: 1v. A pile of this description has the capacity for 1,370 cu yds.

A qualified person, familiar with the plan will be on site to direct the topsoil removal of from these small areas on steep slopes. A twelve inch layer that includes the A, Bw, Bk1 and Bk2 horizons will be removed at site G-29.

Attachment 2-1, the 2008 soil survey report for site G-30, recommends that the soil salvage operation is monitored since the soils are vary in depth. The soil survey indicates that the topsoil layer 3 inches and the desirable subsoil is 3 – 8 inches deep. Attachment 2-2 estimates that an average of ten inches will be salvaged from the 0.9 acre disturbed area, although there are no chemical analyses on which to base the increased salvage depth (see deficiency written under R645-301-223).

An area of 1.7 acres has been outlined as disturbed for permitting purposes. The dimensions of the stockpile are described in Attachment 2-2 for a stockpile holding 1,235 cu yds. If only 8 inches is salvaged, then only 968 cu yds would be stored in the stockpile and the stockpile would be  $\frac{3}{4}$  the described height of 10 ft (Table 2-2).

For the most effective erosion control protection through interim reclamation, the topsoil stockpile slopes will not exceed 2h:1v. Erosion control methods for all stockpiles will include

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creation of stable slopes and a berm around the base of the stockpile. This berm will be constructed of subsoil, but not excavated from around the topsoil stockpile. Surface gouging of the pile face and seeding with seed listed in Table 3-2 will be done to control erosion.

At some pad sites, stockpile slopes steeper than 2h:1v have been created **temporarily**. The steeper stockpile slopes allow for less disturbed area, but create difficult conditions for vegetation establishment. These steeper slopes are temporary and **will be reduced during contemporaneous reclamation** of the drilling pad sites. A projected date for contemporaneous reclamation of each site is provided in the table in Attachment 5-2. Sites G-2 and G-5 were contemporaneously reclaimed in 2008.

Subsoil will be excavated for use as berms and to create a mudpit at each site (Sec. 231.100, Methane Degassification Volume).

**Findings:**

Attachment 2-1, the 2008 soil survey report for site G-30, recommends that the soil salvage operation is monitored since the soils are vary in depth. The soil survey indicates that the topsoil layer 3 inches and the desirable subsoil is 3 – 8 inches deep. Attachment 2-2 estimates that an average of ten inches will be salvaged from the 0.9 acre disturbed area, although there are no chemical analyses on which to base the increased salvage depth (see deficiency written under R645-301-223).

Prior to approval, provide the following in accordance with:

**R645-301-131**, The soil survey presented in Attachment 2-1 must state the name of the soil scientist conducting the work and the date of collection. (Missing cover page?)

## RECLAMATION PLAN

### TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240

**Analysis:**

This amendment states that excess drill cuttings will be hauled to the waste rock site. The remainder of the reclamation plan for all the degas wells remains unchanged as described below.

#### Degas Well Sites [06092009]

The reclamation timetable is shown on Figures 5-15 and 5-26. Unless otherwise specified, sites will be reclaimed in one phase after methane venting ceases. The well sites will be graded, topsoiled, roughened, seeded, and mulched (see Figures 5-4, 5-8, and 5-12). Topsoil replacement depth for each site is listed in Table 2-3. Delays in well plugging will occur as described in Sec.242.100.

The plan describes the reclamation of the drilling mud pits in Section 242.100. The mud pit will be allowed to dry and will be filled with soil that will be compacted to minimize settling. There will be mixing of the cover material with the rock fragments and sediments of the mud pit to avoid creating an abrupt boundary between the layers.

The plan indicates the sites will be ripped to a depth of eighteen to twenty four inches (Section 242.100 and 341.200) to reduce compaction. This ripping method may not be applicable at site G-25 where hard shale (Cr) was noted at 31 inches or at site G -26 where lithic contact was found at 11 inches.

Topsoil will be re-spread using a trackhoe. The soils will be handled when loose and friable (not too wet, not too dry), see Section 242.100. Redistribution thickness is shown in Table 2-3.

Section 542.100, Attachment 2-4 and Figure 5-26 indicates the weeks to completion from the start of reclamation activities. Reclamation of the AMV road will not take place until final reclamation of sites G-18 and G-31. Road base will be retained in the fill during reclamation (Attachment 5-4). Attachment 5-2 includes a reclamation record showing that sites G-2 and G-5 have been contemporaneously reclaimed and sites G-3, G-4, and G-6 have had final reclamation completed as of June 2009.

#### **Soil Nutrients and Amendments**

Soil nutrients and amendments will be applied to the redistributed soils based on analyses of samples collected from the stockpiled topsoil as compared with baseline information.

#### **Soil Stabilization**

Soil may be replaced at grades of up to 1.5h: 1v (p. 5-70). The steepness of these slopes will be reduced at their base, providing a concave slope. Soil stabilization techniques also include ripping the subsoils (see p. 2-39), gouging all slopes 3H: 1V or greater after topsoil

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application (p. 2-40 and 5-76) and hydromulching the seeded surface (p. 2-41 and 3-44 and 3-50). Slopes which are 3h: 1v or steeper will be gouged using a trackhoe (p. 5-70).

**Findings:**

The information meets the requirements of the Regulations.

**RECOMMENDATIONS:**

Through previous reviews of degas wells G-25, G-26, and G-29, the Division has conveyed to the Permittee that the sampling and analysis of soils by horizon, at the time of survey, is required, to allow the Division to have adequate information to provide comment on the topsoil salvage operation. This application recognizes that the chemical analysis must be provided and contains a commitment to provide the analysis to the Division for comment two weeks prior to initiating construction of degas wells G-29 and G-30.