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TECHNICAL MEMORANDUM
Utah Coal Regulatory Program

June 4, 2009

TO: Internal File

THRU: Steve Christensen, Team Lead SC

FROM: Priscilla W. Burton, CPSSc, Environmental Scientist III PWB by SOS

RE: Degassification Volume -- Add Wells G-25 and 26, Canyon Fuel Company, Dugout Canyon Mine, C/007/0039, Task ID #3274

SUMMARY:

Attachment 2-1 of the **Methane Degassification Volume** of the MRP contains baseline survey information gathered from well sites. The G-25 and G-26 wells were surveyed in September 2008. These 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 and G26 follows and established four wheel drive track that is shown on site figures (but was not included on larger scale plates, see deficiency written under R645-301-121.100 by Steve Christensen). The G-25 pad location is on nearly level ground located an elevation of 8,120 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 level knoll. Each well site is expected to disturb an additional 1.8 acres.

With this amendment, the total disturbed acreage for all degas wells is 52.5 acres. This figure includes the G-22 access road and the 15-acre AMV road and topsoil stockpiles along the AMV road. The total disturbed area associated with the mine is approximately 104.7 acres (p. 1-9).

The Dugout Reclamation Agreement was recently revised to include bonding for 101.1 acres (2009/Outgoing/0024.pdf). The MRP itemizes the disturbed acres in the MRP Chap 1, pg 1-9 and in App. 1-4. The MRP itemizes 104.7 acres with this application (Chap 1, pg 1-9 and in App. 1-4). 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.

The following deficiencies are noted with the application:

R645-301-121.100, The disturbed acreage figure on Plate 1-4 requires updating. [PB]

R645-301-121.200, Redraw Figure 2, Attach 5-2 for G-26 to correctly show the knoll in cross section A-A'. [PB]

R645-301-224, Provide laboratory analyses of soils salvaged and stockpiled from each site with the as-builts of the topsoil stockpiles. Since the Bk horizon will be half of the soil salvaged from G-25 and G-26, which is often is the case where topsoil is minimal, Section 243 should be reworded to state that state that the topsoil will include pH, EC, **%CO3 (rather than total carbon)**, SAR, water holding capacity, **fertility (N, P, K) analysis (rather than just nitrogen and phosphorus) and texture**. Please note that this list of analyses is different than that requested for waste rock. [PB]

TECHNICAL ANALYSIS:

GENERAL CONTENTS

RIGHT OF ENTRY

Regulatory Reference: 30 CFR 778.15; R645-301-114

Analysis:

Right of Entry to the surface lands is provided by federal coal lease U-07064-027821, dated January 1, 1957 (MRP Section 114 and Appendix 1-1).

The Surface Owner Agreement between the Thayn Trust and Canyon Fuel Company is included in Appendix 4-2 of the MRP. The agreement will expire in 2019. [09122007]

Findings:

The information provided meets the Right of Entry requirements.

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 37.5 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 52.5 acres.

The total disturbed acreage for the mine is recorded as 104.7 acres. The disturbed acreage for gas wells, roads, refuse pile etc, see is listed on Chapter 1 page 1-9 and Appendix 1-4, both locations were updated with this amendment. Total disturbed area on Plate 1-4 also requires updating.

Findings:

R645-301-121.100, The disturbed acreage figure on Plate 1-4 requires updating. [PB]

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.)

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 $CaCO_3$, 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 and G-26 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 and G26 follows and established four wheel drive track that is shown on site figures (but was not included on larger scale plates). 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 level knoll. Each well site is expected to disturb an acre (Table 2-1), although additional 1.8 acres will be staked off (MRP, Chap 1, p. 1-9).

Site descriptions, sketches, profiles, and soil analyses are in Attachment 2-1 for the degas well sites. The G-25 and G-26 sites were surveyed in August 2008, by Robert Long, CPSSc. The survey indcates that the topsoil or A horizon is less than six inches at both sites. By rule R645-301-232.300, the A and B horizons will be salvaged together to a depth of six inches. The plan describes a twelve inch soil salvage depth (Attachment 2-2). For site G-25, topsoil salvage is not recommended deeper than the required six inches, based upon the clay subsoils, although the laboratory analysis of the representative pedon could have provided further insight into that decision. A soil sample was not taken, and must be provided with as-builts. Insight into the electrical conductivity and SAR of the Helper soil horizons is 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.

This description suggests that the better soils are within the A and Bk horizons and that the Bw horizon should not be stockpiled.

The 1988 Carbon County Soil Survey places the G-25 and G-26 well locations in Map Unit 7, Beje-Trag Complex (3 – 30 percent slopes). However, the Order 1 survey states that the

soils to be disturbed by well G-25 are in the Helper Series, developed on shale. The survey further describes the soils as Typic Haplustepts. Those to be disturbed by site G-26 are in the Moonshine Series developed on sandstone and are further described as Aridic Lithic Ustorthents. Neither series is listed in the 1988 Carbon Co. soil survey. The area of disturbance was drawn, but no delineation of map units was made and the area is assumed to be consistent as described.

The USDA/NRCS website (cited above) places the Moonshine Series in the Upland Shallow Loam (Pinyon-Juniper) range site. Similar ranges sites such as the Podo and Cabba Series produce 500 lbs/ac in a favorable year (1988 Carbon County Soil Survey). The web site does not place the Helper Series in a range site. In the absence of other information, the Helper Series range site is assumed to be similar to the Moonshine Series, based upon the location, elevation, and topography, and perhaps slightly less than the most favorable value of 500 lbs/ac based upon the limited soil development on shale.

Findings:

The information provided does not meet the requirements of the Regulations.

R645-301-121.200, Redraw Figure 2, Attach 5-2 for G-26 to correctly show the knoll in cross section A-A'. [PB]

R645-301-224, Provide laboratory analyses of soils salvaged and stockpiled from each site with the as-builts of the topsoil stockpiles. Since the Bk horizon will be half of the soil salvaged from G-25 and G-26, which is often is the case where topsoil is minimal, Section 243 should be reworded to state that state that the topsoil will include pH, EC, **%CO3 (rather than total carbon)**, SAR, water holding capacity, **fertility (N, P, K) analysis (rather than just nitrogen and phosphorus) and texture**. Please note that this list of analyses is different than that requested for waste rock. [PB]

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 and G-26:
[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. Based upon a twelve inch soil salvage depth, the salvage volume for the 0.9 acre site G-25 would be 1,452 cu yds and the salvage volume for the 0.7 acre site G-26 would be 1,129 cu yds. These approximate numbers were also used in reclamation bonding, MRP, App. 5-6. The Permittee has defined the disturbed area at G-25 and G-26 as 1.8 acres, but expects to disturb only 0.9 and 0.7 acres, respectively. The 0.9 and 0.7 acre figures were used for calculating topsoil salvage. 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 0.9 acres is disturbed, more topsoil will be salvaged and stored than that described in the plan. The Division agrees with the greater depth of topsoil salvage, despite the lack of chemical analysis of the subsoil, due to the shallow soil depth at both well sites.

The topsoil stockpile dimensions are calculated in Attach 2-2 and reported in Table 2-2 for G-25 as 191 ft. length X 40 ft. width X 10 ft high, with slopes of 2 h: 1v. A pile of this description has the capacity for 1,415 cu yds. For site G-26, the following stockpile dimensions are proposed: 75 ft. long X 65 ft. wide X 12 ft. high. A stockpile of this size would hold 1,083 cu yds with 2h:1v slopes.

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 and Bk horizons will be removed at site G-25. A twelve inch layer that includes the A, Bw, and Bk horizons will be removed at site G-26.

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 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:

The information provided meets the requirements of the Regulations.

RECLAMATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

This amendment makes no changes to the reclamation plan described for all the degas wells, 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: lv (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 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: lv or steeper will be gouged using a trackhoe (p. 5-70).

Findings:

The information meets the requirements of the Regulations.

RECOMMENDATIONS:

The application is not recommended for approval.

The Dugout Reclamation Agreement was recently revised to include bonding for 101.1 acres (2009/Outgoing/0024.pdf). The MRP itemizes the disturbed acres in the MRP Chap 1, pg 1-9 and in App. 1-4.

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.