

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

July 9, 2004

OK

TO: Internal File

THRU: Peter H. Hess, Environmental Scientist III/Engineering, Team Lead

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FROM: *PB* Priscilla W. Burton, Environmental Scientist III/Soils

RE: Degasification Wells G-4, G-5, G-6, Canyon Fuel Company, LLC., Dugout Canyon Mine, C/007/039, Task #1943

SUMMARY:

The submittal, received on June 4, 2004, modifies the text of the Methane Degasification Amendment, dated August 2003. The submittal describes the location and development of three ventilation boreholes for the Rock Canyon seam to reduce methane along the longwall panel. Mr. Dan Larsen first surveyed the area soils in June 2003. A change in the location of site G-6 to a previously disturbed area necessitated a second visit by Dan Larsen in May 2004. Mr. Larsen's May 2004 soil report is provided as an update to Attachment 2-1 of the Methane Degasification Amendment).

Well site G-3 was developed in November 2003 and well site G-2 was developed in February 2004. Site G-1 will never be developed (personal communication between Priscilla Burton and Vicky Miller on July 6, 2004).

De-gas drill holes G-4, G-5, and G-6 are in T 13 S, R 12 E, Section 24 and T 13 S, R 13 E, Section 18, as shown on Figure 1-1 and Plate 1-4. The three new wells will add an estimated total of 2.65 acres to the permit area (Table 1-2). Each well will disturb approximately 1 acre. The land is owned by the Thayn Family Trust. This property falls under the Surface Land Owner Agreement dated November 22, 1999, and First Amendment to Surface Use Agreement dated August 13, 2001 between Canyon Fuel Company (CFC) and Thayn. As required by these agreements, CFC has contacted Thayn in writing of the proposed disturbance (Section 412.200).

The Permittee sampled topsoil to gather baseline information from site G-3 and G-2 as they were developed, and has committed to sampling and analyzing the topsoil from sites G-4, G-5, and G-6 at the time of site development. The following parameters will be sampled during soil salvage: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO₃, plant

available Nitrogen, Potassium, and Phosphorus (Section 243). (Information gathered from soil analysis of developed sites G-2 and G-3 should be incorporated into Attachment 2-2 of the MRP as soon as possible.)

The submittal is recommended for approval.

TECHNICAL ANALYSIS:

GENERAL CONTENTS

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

Baseline soils information (Attachment 2-1) was compiled by Mr. Dan Larsen (Soil Scientist) with EIS Environmental and Engineering Consulting on May 17, 2004 and June 10-13, 2003. Mr. Larsen's qualifications have been included in Attachment 2-1 of the Methane Degasification Amendment Wells G-1, G-2, and G-3 to the MRP.

Attachment 2-2 (topsoil calculations) was prepared by Layne Jensen of Earthfax Engineering, Inc., also included in Attachment 2-1 of the Methane Degasification Amendment Wells G-1, G-2, and G-3 to the MRP. Mr. Jensen is a registered, professional engineer.

Findings:

The information provided meets the requirements for the reporting of technical data requirements of the regulations.

ENVIRONMENTAL RESOURCE INFORMATION

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

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.

TECHNICAL MEMO

Analysis:

Appendix 2-2 of the MRP provides a general outlook on the soils of the Book Cliffs in the vicinity of the Dugout Mine. The specific soils information for degasification well sites G-1 through G-6 is found in Attachment 2-1 of the Methane Degasification Amendment Wells G-1, G-2, and G-3 to the MRP. Mr. Dan Larsen conducted the inventory in Attachment 2-1 in June 2003 and May 2004. Site sketches provide valuable estimates of topsoil thickness over the entire site. Mr. Larsen states in the introduction that each site will be developed to a 0.5-acre size, and therefore, topsoil calculations must be adjusted for the 1.0-acre sites described by the application. Sites G-5 and G-6 fall within Map Unit 103, Senchert/Toze Family Complex (Appendix 6.2 – 6.4 of Attachment 2-1). Despite the location of site G-4 within the Map Unit 62, Midfork family – Comodore complex (Appendix 6.2 – 6.4 of Attachment 2-1), Mr. Larsen classified the soils at sites G-4, G-5, G-6 as Senchert Series soils, with an inclusion of Midfork soil at the center of the G-5 pad site.

The 1988 Soil Survey of Carbon County Utah (an Order 3 soil survey) describes the Map Unit 103, Senchert/Toze Family Complex (Appendix 6.2 – 6.4 of Attachment 2-1). The Senchert/Croydon Series are deep soils with silt loam texture and high amounts of organic matter. The effective rooting depth of Senchert soils is 20 to 40 inches. The potential plant community in the Senchert/Toze Family Complex is Douglas fir and canopy of 60%, and understory including 10% grasses, 5 forbs, and 85% shrubs. The important plants are sedges, mountain lover, snowberry, Oregon grape and quaking aspen. The Senchert series is in the High Mountain Loam (Douglas-fir) range site. In a normal year, forage productivity is expected to be 100 lbs/acre (1988 Carbon County Soil Survey).

Site G-4:

The site is located on a 40% slope at an elevation of 8,120 feet (profile description, Appendix 6-6 of Attachment 2-1). Mr. Larsen classifies the soil as a fine-loamy, mixed, Pachic Argicryoll soil type. Topsoil is estimated at 24 – 36 inches (Appendix 6-7 of Attachment 2-1). This site was previously disturbed by logging (Table 3-1, pg 3-16, Attachment 2-1 section 4.3).

Site G-5:

This site is located on a 10 – 20% slope at an elevation of 8,240 ft. Mr. Larsen indicates the soil in the center of the pad site is like the Midfork soil and classifies it as a loamy-skeletal, typic Haplocryoll or Argicryoll soil type. Topsoil is estimated at nine inches (Appendix 6-7 of Attachment 2-1). The remainder of the site is classified as a fine-loamy, Pachic Argicryoll soil type, similar to the soils described at site G-4. Topsoil is estimated at 24 inches for most of the site with a pocket of 50-inch deep mollic epipedon in the NW corner.

Site G-6:

Information gathered for the G-6 site in June 2003 was as follows:

- Located on a 30% slope at an elevation of 8,220 ft.

TECHNICAL MEMO

- Classified as a fine loamy, mixed, superactive Pachic Argicryoll soil type, similar to the soils described at site G-4 and on the periphery of G-5.
- Topsoil is estimated at 36 inches (Appendix 6-7 of Attachment 2-1).
- A portion of the site was previously disturbed by drilling (pp 2-3, 3-16).

The pad location was subsequently moved to the existing surface disturbed roadway and a previously leveled area to protect the adjacent forested area (personal communication with Vicky Miller on July 8, 2004). Mr. Dan Larsen's May 2004 report (Attachment 2-1) indicates variable depths of topsoil availability from the previously disturbed area, from zero in the center of the area, 4 – 6 inches to the south, and 22 – 28 inches of topsoil to the north. The information is summarized in Section 222.400. An average of 12 inches of topsoil depth was used for topsoil calculations.

All Sites:

Soils were not analyzed during the topsoil survey. The application indicates that the topsoil from all sites will be analyzed for the following parameters during soil salvage: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO₃, plant available Nitrogen, Potassium, and Phosphorus (Section 243).

Findings:

The information provided meets the minimum requirements for Soils Environmental Resource Information.

LAND-USE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.22; R645-301-411.

Analysis:

The pre-mining land use is open range for wildlife and livestock and hunting as described in Chapter 4. Table 3-1 provides productivity estimates between 300 – 1,500 lbs/ac (NRCS letter in Attachment 3-1). The highest productivity sites are G-2, G-3, and G-5 (Trag, Brycan and Senchert soils) and the lowest productivity site is G-1 Comodore series soil, previously disturbed by roads and logging.

The land is owned by the Thayn Trust and is the subject of the Surface Use Agreement between Canyon Fuel Co. and the Thayn Trust dated November 22, 1999 and the First Amendment to the Surface Use Agreement dated August 13, 2001 (Attachment 4-2). This agreement describes hunting as another use of the land. Communication with the landowner is found in Attachment 4-2.

TECHNICAL MEMO

Findings:

The information provided meets the Land Use requirements of the Regulations.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

Analysis:

Alluvial Valley Floor Determination

The sites are at elevations of 8,100 to 8,400 feet on the plateau between Dugout Canyon and Pace Canyon. Alluvial sediments deposited by Dugout and Pace Creek drainages are far below the site as shown on Plate 6-1 of the MRP. Although Site G-2 has soils in the Brycan series that developed from alluvial deposition, they are presently not being irrigated or cultivated. Site G-2 is currently being used for open range.

Findings:

The Division finds that the methane degasification well sites are not located in an alluvial valley floor.

PRIME FARMLAND

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

Analysis:

Prime farmland does not exist at this elevation in the Book Cliffs. The growing season is short (60 days) and there is no developed water source. The Utah Agricultural Experiment Station Research Report Number 76 entitled "Important Farmlands of Parts of Carbon, Emery, Grand, and Sevier Counties" does not include R 12 E, T 13 S.

Regulation R645-302-313 requires that a reconnaissance inspection is done for all permit applications whether or not Prime Farmland is present and that the Division and Natural Resource Conservation Service will determine the extent of the reconnaissance inspection. On April 24, 2003, the Division consulted with Gary Roeder, Area Conservationist with the NRCS

Price Field Office. Mr. Roeder stated that developments anywhere in the permit area at these elevations would not fit the parameters of prime farmland.

Findings:

The Division in consultation with the Natural Resources Conservation Service determines that there are no prime farmlands in the location of the proposed degasification wells G-1, G-2, G-3, G-4, G-5, and G-6.

OPERATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

Topsoil Removal and Storage

Site G-4:

Figure 5-17 provides a contour map. Figure 5-18 provides cross-sections for site development. Figure 5-19 provides the operational layout for the life of mine. The access road to this site is pre-existing and will not be reclaimed (Section 242.100).

Table 1-2 states G-4 will be 0.7 acres of disturbance. Figure 5-17 illustrates the layout of disturbance and from this figure, the Division notes that 0.3 acres of the disturbance will be for operational use and the remainder will be topsoil and undisturbed area within the disturbed area boundary.

Section 222.400 indicates that the average depth of topsoil salvaged from site G-4 will be 28 inches. However, Table 2-1 indicates 750 cu yds of topsoil will be salvaged. The Division's calculations for a 0.3 ac area and 28 inches of salvage produce 1,171 cu yds of soil.

Earthfax calculations for soil salvage are provided in Attachment 2-2. They indicate that there will be no soil salvage from the existing roadway (0.08 acres); an average of 12 inches will be salvaged from the previously disturbed area (0.15 ac); and an average of 26 inches from the undisturbed area (0.15 ac). A total of 750 cubic yards is calculated using this information.

TECHNICAL MEMO

The Division concludes that the depth of salvage listed for G-4 in Attachment 2-2 is in error for this site, because the assumption is made that the undisturbed area will have an average of 28 inches removed and the previously disturbed area will have an average of twelve inches removed. However, the soil survey indicates an average of 28 inches for the entire site, disturbed and undisturbed.

Projected topsoil dimensions are 105 ft x 30 ft x 13 ft high (Table 2-2) and will accommodate only 750 cu yds, not 1,100 cu yds calculated using the soil survey information. The Permittee should plan for a larger topsoil stockpile if this site is developed. This site may not be developed, just as site G-1 was not developed (personal communication with Vicky Miller on July 8, 2004.)

Figure 5-18 indicates in cross section A-A that the site will be cut to a depth of about 10 feet on the south east side. Figure 5-19 indicates that the mud pit will be further incised in this location. Soil survey information indicates this is deep soil, depth to bedrock was not specified. The volume of material excavated for the mud pit at each site is estimated at 110 cu yds (Section 231.100) or a hole that 8 yds square and 1.7 yds (five feet) deep.

Site G-5:

Figure 5-20 provides a contour map. Figure 5-21 provides cross-sections for site development. Figure 5-22 provides the operational layout for the life of mine. The 200-foot access road to this site is not pre-existing and will be constructed after topsoil is removed (Fig 5-20).

Table 1-2 states G-5 will be 1.2 acres of disturbance. Section 222.400 indicates that the average depth of topsoil salvaged from site G-5 will be 22 inches. Table 2-1 indicates 1,909 cu yds of topsoil will be salvaged.

Figure 5-22 illustrates the layout of disturbance and from this figure, the Division notes that 0.38 acres of the disturbance will be for operational use and the remainder will be topsoil stockpile, access road and undisturbed area within the disturbed area boundary. The Division's calculations for a 0.38 ac area and 22 inches of salvage produce 557 cu yds of soil and the 200 ft X 20 ft roadway will generate 296 cu yds (average 24 inch removal). The total to be expected from this site is 853 cu yds.

Earthfax calculations for soil salvage are provided in Attachment 2-2. Earthfax calculated a 6,018 sq ft roadway (300 ft X 20 ft) will generate 409 cu yd with 22 inches of salvage. Earthfax calculated a volume of 1,500 cu yd from the pad area (0.5 acres). A total of 1,909 cu yds is calculated using this information.

TECHNICAL MEMO

The Permittee's estimate of recoverable topsoil (Table 2-1) exceeds the Division's for site G-5. Proposed dimensions for the stockpile are 90 ft x 65 ft x 21 ft high (Table 2-2).

Figure 5-21 indicates in cross section A-A that the G-5 site will be cut to a depth of about 15 feet on the south east side. Figure 5-22 indicates that the mud pit will be further incised in the pad center. Soil survey information indicates this is deep soil, depth to bedrock was not specified. The volume of material excavated for the mud pit at each site is estimated at 110 cu yds (Section 231.100) or a hole that 8 yds square and 1.7 yds (five feet) deep.

Site G-6:

Figure 5-23 provides a contour map. Figure 5-24 provides cross-sections for site development. Figure 5-25 provides the operational layout for the life of mine. The access road to this site is pre-existing and will not be reclaimed (Section 242.100).

Table 1-2 states G-6 will be 0.75 acres of disturbance. Section 222.400 indicates that the average depth of topsoil salvaged from site G-6 will be 12 inches. Table 2-1 indicates 792 cu yds of topsoil will be salvaged.

Figure 5-25 illustrates the layout of disturbance and from this figure; the Division notes that 0.37 acres of the disturbance will be for operational use including the topsoil stockpile. The remainder of the 0.75 acre disturbed area boundary encompasses undisturbed area within the disturbed area boundary. The Division's calculations for a 0.38 ac area and 12 inches of salvage produce 613 cu yds of soil.

Earthfax calculations for soil salvage are provided in Attachment 2-2. Earthfax calculated that the pad area of 0.49 acres would generate 792 cu yd with 12 inches of salvage.

The Permittee's estimate of recoverable topsoil (Table 2-1) exceeds the Division's for site G-5. Proposed dimensions for the stockpile are 105 ft x 30 ft x 13 ft high (Table 2-2).

Figure 5-24 indicates in cross section B-B that the G-6 site will be cut to a depth of about 15 feet on the west side. Figure 5-25 indicates that the mud pit will be further incised in the pad center. Soil survey information indicates this is deep soil, depth to bedrock was not specified. The volume of material excavated for the mud pit at each site is estimated at 110 cu yds (Section 231.100) or a hole that 8 yds square and 1.7 yds (five feet) deep.

All sites:

The topsoil stockpiles will be within the perimeter fence so that the stockpiles are not overgrazed. Berms around the topsoil stockpiles will be constructed of subsoil. The berm

TECHNICAL MEMO

design is described in Appendix 7-1, the volume of subsoil required for berm construction is provided in Section 231.100.

Vegetation will be removed and stored on the perimeter of the disturbed area for use in reclamation (Section 231.100) or alternatively hauled offsite for disposal (Section 232.600) at the discretion of the Permittee. The Division's preference is for the grubbed vegetation to remain on site to be used as cover and protection for the reclaimed site.

A qualified person will supervise the soil salvage operations (Section 231.100). Steepness of grade has not been cited as a limitation to topsoil salvage at these sites (Section 232.700). A dozer or front-end loader will be used for topsoil removal (Section 232.100). The stockpile dimensions for each site are outlined in Table 2-2. Slopes of the stockpile will be 1h:1v. Slopes will be reduced to 2h:1v during the operational phase of the site and before seeding (Section 231.400).

A berm or silt fence will be constructed around the stockpile and the stockpile will be roughened and seeded with the mix described in Table 3-2 (Section 234.200).

A commitment in Section 243 of the application indicates that during salvage, the topsoil will be analyzed for the following parameters: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO₃, plant available Nitrogen, Potassium, and Phosphorus.

Findings:

Projected topsoil dimensions for site G-4 have been adjusted according to the Division's comments written above (personal communication with Vicky Miller on July 8, 2004.). The information provided meets the minimum requirements of the Operation Plan, Topsoil and Subsoil removal.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Acid- and Toxic-Forming Materials and Underground Development Waste

The well design is shown on Figure 5-16. The well will be drilled to a depth twenty feet above the coal seam (approximately 2,000 feet). Fragments of various rock strata will be

brought to the surface with the air drill along with any water encountered. After drilling is completed, the mud pit will be allowed to dry and the drilling fragments will be mixed with the excavated subsoil from the mud pit. This practice should reduce any potential concentrations of salinity or acidity.

Previous investigations have not found acid or toxic materials in the strata (Section 623 and Appendix 6-1 and 6-2). Water was encountered during drilling at this location at a depth of about 1500 feet. There has been no water reported during monitoring in this vicinity. The Division does not expect there to be a problem with acid/toxic materials and does not expect there will be much water encountered in the drilling.

Findings:

The information provided is adequate for the purposes of the Regulations.

RECLAMATION PLAN

TOPSOIL AND SUBSOIL

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

Analysis:

Redistribution

The reclamation timetable is shown on Figure 5-26 for sites G-4 through G-6. These sites will be reclaimed in one phase after methane venting ceases. The area will be graded, topsoiled, roughened, seeded, and mulched (see Figures 5-4, 5-8, and 5-12).

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.

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.

TECHNICAL MEMO

The soils will be analyzed during soil salvage for the following parameters: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO₃, plant available Nitrogen, Potassium, and Phosphorus (Section 243) to determine if amendments are needed.

Findings:

The information provided meets the minimum requirements of the Reclamation Topsoil Redistribution Regulations.

CONTEMPORANEOUS RECLAMATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.100; R645-301-352, -301-553, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

General

Experience gained from development of site G-3 indicates that the lifespan of the vent boreholes may be fairly short (less than one year). Therefore the proposal indicates sites G-4 through G-6 will be fully reclaimed in a single operation upon cessation of methane venting (Section 341), rather than a two stage reclamation plan described for degas holes G-1 through G-3.

Findings:

The information provided is adequate for the purposes of the regulations.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

The area will be ripped to a depth of 18 – 24 inches (Section 242.100).

Erosion control measures will include silt fences and berms (Section 231.100), seeding, and mulching of the soils (Sections 244.200 and 341.200.) Disruptive gullies (greater than nine inches) will be reseeded (244.300). Surfaces will be left rough. Mulch will be applied at 2,000 lbs/ac with a tackifier Section 341.200).

The Permittee should contemplate the addition of mulch generated from the grubbing of vegetation. This would be an inexpensive method of adding surface protection.

Findings:

The information provided is adequate for the purposes of the regulations.

RECOMMENDATION:

The Permittee has committed to sampling and analysis of the salvaged topsoil from all sites during development. Topsoil will be analyzed for the following parameters during soil salvage: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO₃, plant available Nitrogen, Potassium, and Phosphorus (Section 243). The information gained from this analysis should be placed in the MRP, along with quantities of topsoil salvaged.

The application is recommended for approval at this time.