

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

October 27, 2008

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TO: Internal File

THRU: Jim Smith, Permit Supervisor *JS 11/09/08*

FROM: Steve K. Christensen, Environmental Scientist/Hydrologist *SKC*

RE: Degas Well G-22 and Access Road, Canyon Fuel Company, LLC., Dugout Canyon Mine, C/007/0039, Task ID #3068

SUMMARY:

On September 30th, 2008, the Division of Oil, Gas and Mining (the Division) received an application from Canyon Fuel Company (the Permittee) for the construction of methane degas well G-22 and its associated access road. The proposed degas well and access road will provide additional methane gas venting above the area of longwall panel GIL-8. The Permittee has provided the hydrologic calculations and information relative to culvert design and sizing, stockpile runoff volumes, and stockpile runoff containment.

Degas well G-22 is located within the current permit area. The proposed degas well and access road will add an additional 3.5 acres of disturbed area within Township 13 South, Range 13 East in portions of the SE $\frac{1}{4}$ and NE $\frac{1}{4}$ of Section 18. The following analysis has been assigned a review number of Task ID #3068 for tracking purposes.

The hydrologic information provided in the Degas Well G-22 and Access Road application meets the requirements of the State of Utah R645-Coal Mining Rules. The application should be approved.

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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.

GENERAL

Regulatory Reference: 30 CFR 783.12; R645-301-411, -301-521, -301-721.

Analysis:

The application meets the hydrology requirements for general information as provided in R645-301-721. The proposed location for the G-22 degas pad and associated access road is within the approved permit boundary. Beginning on page 7-1 of the application, the Permittee provides references to the sections of the approved MRP that provide the general hydrologic resource information in the proposed project area. Figure 7-1 of the MRP shows a generalized hydrostratigraphic cross section of the permit area as well as the proposed well site. Plate 7-2 of the MRP depicts the locations of surface-water bodies and existing or pending water rights. In addition section 724 of the MRP provides baseline ground and surface water information for the permit area including the proposed degas well site.

Findings:

The application meets the General hydrologic information requirements of the State of Utah R645-Coal Mining Rules.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.

Analysis:

The application meets the hydrology requirements for Climatological Resource Information as provided in R645-301-724. Page 7-4 of the application provides a reference to Appendix 4-1 of the approved MRP and RA Attachment 7-5 of the Refuse Pile Amendment where climatological data for the proposed project area is provided.

Findings:

The application meets the Climatological Resource Information requirements as outlined in the State of Utah R645-Coal Mining Rules.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

Geologic information for the proposed location for degas pad G-22 and the associated access road is presented in Chapter 6 of the application as well as in Chapter 6 of the approved MRP.

Findings:

The information provided meets the Geologic Resource Information requirements as provided in R645-301-724.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and Analysis

The application meets the Sampling and Analysis requirements of the State of Utah R645-Coal Mining Rules. Page 7-3 of the application provides a reference to Section 723 of the approved MRP in regard to Sampling and Analysis. Section 723 of the approved MRP states that water samples will be collected and analyzed according to the methods outlined in "Standard Methods for the Examination of Water and Wastewater" and 40 CFR parts 136 and 434.

Baseline Information

The application meets the Baseline Information requirements of the State of Utah R645-Coal Mining Rules.

In section 724, Baseline Information, the Permittee discusses the ground and surface water resources in the area of the proposed degas well. Division staff conducted a field

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inspection of the proposed location on October 23rd, 2008. It was observed that defined drainage channels are located on either side of the proposed pad location (essentially east and west of the pad). In addition, the alignment of the proposed access road will cross the western drainage and require the installation of a culvert in order to safely divert the water and prevent a failure.

Based upon the small size of the contributing watershed to these two drainages, the lack of any evidence of riparian vegetation and upon observations of no flow by Division staff as well as the Permittee, the drainages do not appear to be intermittent or perennial.

The seep and spring studies of the area are provided in Chapter 7 of the MRP. Plate 7-1 depicts the locations of the springs and seeps identified in those studies. No seeps and springs were identified within the watershed of the two drainages.

Modeling

The application meets the Environmental Description requirements for Modeling. No ground or surface water modeling was conducted in preparation for the gob vent hole installations.

Probable Hydrologic Consequences Determination

The application meets the Probable Hydrologic Consequences (PHC) Determination requirements of the State of Utah R645-Coal Mining Rules.

On page 7-11 of the application, the Permittee discusses the probable hydrologic consequences (PHC) of the proposed degas well and associated access road on hydrologic resources within the area. Based upon the presented baseline information (See Section 724 of amendment), no seeps and springs are located within in the area of the proposed degas well. The seep and spring studies of the area are provided in Chapter 7 of the MRP. Plate 7-1 depicts the locations of the springs and seeps identified in those studies. No seeps and springs were identified within the watershed of the two drainages.

Division staff conducted a field inspection of the proposed location on October 23rd, 2008. It was observed that defined drainage channels are located on either side of the proposed pad location (essentially east and west of the pad). In addition, the alignment of the proposed access road will cross the western drainage and require the installation of a culvert in order to safely divert the water and prevent a failure.

Due to the small size of the contributing watershed to these two drainages, the lack of any evidence of riparian vegetation and upon observations of no flow by Division staff as well as the Permittee, the drainages do not appear to be intermittent or perennial.

Due to the lack of seeps and springs in the area as well as the ephemeral nature of the drainages located adjacent to the degas pad, the probable hydrologic consequences of the proposed degas well and access road are minimal. The Permittee has committed to installing sediment controls prior to construction. The sediment controls will remain in place during construction and operation. The Permittee further commits to leave the sediment controls in place during reclamation until such time that the Division determines that vegetation has been established and the reclaimed slopes are stable. As a result of the sediment controls to be implemented at the proposed degas and access road site, the potential for impacts to hydrologic resources is minimal.

Findings:

The application meets the Hydrologic Resource Information requirements of the State of Utah R645-Coal Mining Rules.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Monitoring and Sampling Location Maps

The application meets the requirements for Monitoring and Sampling Location Maps. Plate 7-1, Hydrologic Monitoring Stations, has been updated to depict the additional surface water monitoring station (PC-3) located at the confluence of the drainage east of the proposed road alignment and Pace Creek.

Subsurface Water Resource Maps

Plate 7-1 (Hydrologic Monitoring Stations) of the approved MRP depicts the subsurface water resources in the vicinity of the proposed gob vent hole site.

Surface Water Resource Maps

Plate 7-1 (Hydrologic Monitoring Stations) of the approved MRP depicts the surface water resources in the vicinity of the proposed gob vent hole site.

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Well Maps

Plate 7-1 (Hydrologic Monitoring Stations) of the approved MRP depicts the locations of the monitoring wells within the permit area. Monitoring well GW-19-1 is located approximately $\frac{1}{2}$ to $\frac{3}{4}$ of a mile west of the proposed gob gas vent hole site for G-19.

Findings:

The hydrologic information provided meets the Maps, Plans and Cross Sections of Resource Information requirements as provided in R645-301-722 and R645-301-731.

OPERATION PLAN

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

Analysis:

Plans and Drawings

The application meets the Plans and Drawings for Road Systems and Other Transportation Facilities requirements of the State of Utah R645-Coal Mining Rules.

The road alignment and associated cross-sections are provided in Attachment 5-1. Figure 1, Contour Map for G-22, provides the location and alignment of the road and depicts the approximately location for the culvert placement. Figures 2 through 2E provide the typical cross sections and a profile for the proposed access road.

Figure 2 of Attachment 7-1, Road Runoff Culvert Plan, provides the design plans and drawings for the culvert installation located approximately 350' west of drill pad G-22. Figure 2 also provides a typical cross-section of the access road. The cross section shows that the road will be sloped (1-2%) towards the hillside. An incised ditch at the toe of the hillside will convey road runoff down gradient. Figure 1 of Attachment 5-4 provides a typical road cross section for the G-22 access road.

The access road to drill pad G-22 is approximately 0.21 miles long. The road will be constructed along the contour of the hillside beginning at degas pad G-16 and proceeding to the proposed location of degas pad G-22.

On page 5-11, the Permittee commits to seeding the out slopes of the access road during operations to encourage the establishment of vegetation and erosion control.

Performance Standards

The application meets the Performance Standards for Road Systems and Other Transportation Facilities as required by the State of Utah R645-Coal Mining Rules.

Attachment 7-1 provides the hydrologic calculations utilized in designing the proposed road drainage system and sediment control techniques to be utilized for the well pads, soil stockpiles and access road. The Permittee utilized HydroCAD 8.0 software for calculating the peak flows to be utilized in designing the aforementioned drainage components. Figure 1, *Degas Well Pad G-22 Watershed Hydrology*, of Attachment 7-1 depicts the watershed boundaries utilized in the hydrologic calculations.

The Permittee determined the CN based on NRCS soils maps. A weighted curve number of 74 was utilized in the modeling/hydrologic calculations. A curve number of 74 appears reasonable given the observed conditions of the proposed degas and access road location.

The Permittee utilized a 10-year, 6-hour storm event for the design of the road ditches and water bars. A 10-year, 24-hour event was utilized to design the culvert that will convey the storm runoff from the drainage located approximately 300-400' west of the proposed degas pad. As such, the culvert calculations are beyond the regulatory requirements of the State of Utah R645-Coal Mining Rules that outline the use of a 10-year, 6-hour design storm event for the diverting of perennial and intermittent streams. The design storm data utilized in the hydrologic calculations was obtained from the *Precipitation-Frequency Atlas of the United States*, N.O.A.A. Atlas 14, Volume 1, Version 4, 2006.

The Permittee provides the soil stockpile containment calculations in Attachment 7-1. As with the ephemeral drainage culverts, a 10 year 24 hour design storm event was used in calculating the storm volumes and berm storage capacities. The berms have been designed to fully contain the 10 year 24 hour design storm event.

Page 5-10 of the application discusses the maintenance plan to be implemented during the construction and operation of the degas wells and access road. The Permittee states, "When necessary during the normal use of the AMV road and access road to G-22, it will be graded, berms will be repaired, culverts inlets/outlets and ditches will be cleaned." On page 7-14, the Permittee further discusses the maintenance of the various drainage and sediment control structures. The silt fences and/or straw bale dikes will be periodically inspected and accumulated sediment will be removed as needed to maintain functionality.

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Findings:

The hydrologic information provided meets the requirements of the R645-State of Utah Coal Mining Rules.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Disposal Of Noncoal Mine Wastes

The application states that no hydrocarbon products will be stored at the well sites. However, the Permittee has stated that absorbent materials will be used for the collection of leaked fuels, greases and other oils that may be spilled during the installation of the vent holes. The saturated absorbent materials will then be disposed of at an appropriate landfill facility.

Findings:

The hydrologic information provided meets the Spoil and Waste Materials Operation requirements as provided in R645-301-747.

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:

General

The application meets the requirements for General Hydrologic information as required by the State of Utah R645-Coal Mining Rules. The Hydrologic Information is presented in chapter 7 of the application. The application discusses the potential impacts to hydrologic resources, provides the design criteria and hydrologic designs utilized at the degas site and also

provides the applicable hydrologic performance standards for the drainage features at the degas sites.

Acid- and Toxic-Forming Materials and Underground Development Waste

The application states that no acid or toxic forming materials have been identified in the soils or strata of the Dugout Canyon Mine. The application references Appendix 6-2 of the approved MRP that outlines the finding that the Dugout Canyon Mine area does not contain potentially acid forming or toxic material. The application also references Chapter 6, Section 623 of the Methane Degasification Amendment, which states, "No acid or toxic forming materials will originate at the well sites."

Diversions: General

The application meets the Diversions: General requirements of the State of Utah R645-Coal Mining Rules. See the Roads and Other Transportation Facilities performance standard discussion above for specifics on the design considerations utilized to size the diversion. Attachment 7-1 of the application provides the culvert design calculations as well as design drawings of the culvert installation and outlet detail.

Stream Buffer Zones

The application meets the Stream Buffer Zone requirements of the State of Utah R645-Coal Mining Rules.

Based upon the baseline characterization provided in Section 724 of the amendment, the drainages located adjacent to the proposed degas pad are ephemeral in nature and as such, do not require a stream buffer zone.

Sediment Control Measures

The application meets the Sediment Control Measure requirements of the State of Utah R645-Coal Mining Rules.

The application discusses sediment control measures in Sections 532, 732, 742 and 752. The Permittee commits to utilizing berms, silt fences and/or straw bale dikes to control sediment transport off the disturbed area. The sediment controls will be installed prior to construction and will be maintained through the operational and reclamation phases. Sediment controls will be installed prior to construction and will remain in place during the operational and reclamation phases of the degas pads and associated roads. Removal of the structures during reclamation is addressed in Section 761.

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The Permittee commits to periodically inspecting all degas drill sites and associated access roads. The inspections will include, but not be limited to inspections following major precipitation events. Based upon the inspections, the sediment controls will be repaired and accumulated sediment removed as needed in order to maintain functionality and retain sediment on the disturbed area.

In addition, the Permittee commits to bi-annual inspections of the sediment controls with Division staff: one inspection in the spring/early summer and one in the fall. Based upon those inspections, the Permittee commits to repairing the sediment controls as needed in a timely fashion following the spring/early summer inspection and prior to the onset of winter/non-accessible conditions following the fall inspection.

The sediment control measures utilized at the degas pads and associated access roads will be maintained until removal is authorized by the Division and the disturbed area has been stabilized and revegetated (See Section 761 of the application).

Siltation Structures: General

The application meets the Operational Plan requirements for Siltation Structures: General as provided in R645-301-742.212. No sediment ponds are proposed for this project.

Siltation Structures: Other Treatment Facilities

The application provides calculations and design considerations for the relative berm heights and silt fence dimensions for three areas of the pad: the pad stockpile, the upper road stockpile and the lower road stockpile. The berms were designed by utilizing the Soil Conservation Service (SCS) method for calculating peak flows. The SCS method incorporates generalized loss-rate and runoff relationships developed from watershed studies in the United States. A total runoff volume was calculated for the pad area utilizing a 10-year, 24-hour rainfall event as required by state regulations (Other Treatment Facilities--R645-301-742.230). Berm dimensions were then calculated to contain the design storm event for each of the three areas outlined above.

The application provides the calculations utilized in determining the proper silt fence and berm sizing to handle the 10-year, 24-hour storm event.

Impoundments

The application meets the Impoundment requirements of the State of Utah R645-Coal Mining Rules.

On page 7-17 of the application, the Permittee states, "No permanent impoundments will exist at the well sites".

Findings:

The hydrologic information provided meets the Hydrologic Information requirements of the State of Utah R645-Coal Mining Rules

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Monitoring and Sampling Location Maps

The application meets the requirements for Monitoring and Sampling Location maps. The Permittee has updated Plate 7-1 (Hydrologic Monitoring Stations) of the approved MRP to depict the additional surface water-monitoring site to be located at the confluence of Pace Creek and the ephemeral drainage located next to the proposed access road.

Certification Requirements

A certified professional engineer registered with the state of Utah has stamped the submitted maps, plans and cross sections.

Findings:

The application meets the Maps, Plans and Cross Sections of Mining Operations requirements of the State of Utah R645-Coal Mining Rules.

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RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

The reclamation plan is presented in section 540 of the application, with additional information provided in Attachment 5-4. Natural drainage patterns will be restored after degasification is completed. The cut and fill slopes will be reshaped at the well sites. When a siltation structure is removed, the land on which the siltation structure was located will be regraded in accordance with the reclamation plan presented in Section 540. Upon the termination of degasification efforts, the gob vent holes will be sealed in accordance with Federal Regulations 43 CFR CH. 11, Subpart 3484, (3) per a decision by the BLM and the Division. Figure 5-26 outlines the reclamation schedule for degas pad G-22 and it's access road. Figures 2 through 2E provide the post-mining topography that will be re-established once degasification efforts have ceased at well G-22.

Findings:

The application meets the General Reclamation Plan requirements of the State of Utah R645-Coal Mining Rules.

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

The proposed access road and drill pad will be returned to their approximate original contour during reclamation as detailed in Attachment 5-1. On page 5-16, the Permittee states, "The sites will be regarded to the approximate original contour." Drainages will be restored following the removal of the culvert and any associated structures. Attachment 5-1 of the application provides cross-sections that depict the final surface configuration of the pad and

access road. Figures 2 through 2E provide the post-mining topography that will be re-established once degasification efforts have ceased at well G-22.

Findings:

The application meets the Approximate Original Contour requirements of the State of Utah R645-Coal Mining Rules.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

Analysis:

Reclamation

The application meets the Reclamation of Road Systems and Other Transportation Facilities requirements of the State of Utah R645-Coal Mining Rules.

The roads that existed prior to the drilling program will be retained after reclamation. The access roads established during the drilling program will be reclaimed after methane extraction has been completed.

The access road utilized for degas well G-22 will be returned to its approximate original contour during reclamation as detailed in Attachment 5-4. Drainages will be restored following the removal of culverts and any associated structures. The reclaimed segments of the drainages will be tied into the existing segments of the drainage. When possible, the restored drainages will be armored with native rock obtained and stockpiled during the construction phase of the access road. Reclaimed drainages will be seeded with the approved seed mix. The road surface will be ripped a minimum of 12 inches prior to the placement of subsoil and topsoil. If it becomes necessary to add gravel to the road surface during the operational phase, it will be left in place and ripped to relieve compaction. Subsoil fill material and topsoil will be placed on top of the ripped surface.

Findings:

The application meets the Reclamation of Road Systems and Other Transportation Facilities requirements of the State of Utah R645-Coal Mining Rules.

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CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

No additional impacts are expected from the construction of gob vent G-22 and the proposed access road.

Findings:

The hydrologic information provided meets the Cumulative Hydrologic Impact Assessment requirements as provided in R645-301-730.

RECOMMENDATIONS:

The hydrologic information provided in the application meets the requirements of the State of Utah R645-Coal Mining Rules.

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