

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

December 21, 2007

OK

TO: Internal File

THRU: Pamela Grubaugh-Littig, Permit Supervisor *PL*

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

RE: Permit Area Expansion- 560 Acres, Canyon Fuel Company, LLC, Dugout Canyon Mine, C/007/0039, Task ID #2873

SUMMARY:

On October 25, 2007, Canyon Fuel Company (the Permittee) provided the Division of Oil, Gas and Mining (the Division) with an application to expand their current permit area an additional 560 acres. The additional acreage is comprised of both State and Federal leases. 240 acres of additional permit area is being added to existing Federal Coal Lease U-070674-027821. The remaining 320 acres is part of State Lease ML-50582-OBA that was issued to the Dugout Canyon Mine in 2007 and is being added to the permit area at this time.

No additional surface disturbance is associated with this permit expansion application. Future surface disturbance associated with methane degasification wells will be addressed in subsequent permitting actions. The following analysis has been assigned a review number of Task ID #2873 for tracking purposes.

The hydrologic information provided in the Permit Area Expansion- 560 Acres submittal (the application) does not meet the requirements of the State of Utah R645-Coal Mining Rules. The application should not be approved at this time.

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Deficiencies:

R645-301-724: Baseline Data Collection (Surface and Groundwater)

- The Permittee must provide data that demonstrates seasonal variation in both surface water quality and surface water quantity for the Cow Canyon and unidentified drainage located in Sections 16 and 17 respectively of the proposed permit expansion area. The Division's Tech 004-Water Monitoring guideline recommends two years of baseline data collection. In order to establish seasonal variation and meet the baseline requirements, a minimum of one full calendar year of data is required. In addition, in order to adequately assess the potential for mining related impacts on the drainage, the Permittee needs to establish where the perennial flow begins in these drainages relative to the mine plan and projected subsidence impacts.
- The Permittee must provide additional groundwater baseline data or provide a scientifically justifiable reason for not doing so. Springs 211, 212, 213 and 214 are located within the Cow Canyon drainage. According to the approved MRP, they were sampled one time on November 21, 1998. Springs 261, 262 and 263 are located in the unidentified drainage in Section 17 and according to the approved MRP, were sampled one time on November 21, 1998. Attachment 1 of the Update to the Probable Hydrologic Consequences of Coal Mining at the Dugout Mine in Appendix 7-3 (PHC Update) contains the baseline spring field data for the proposed expansion. The spring data provided reveals that at the most, the springs were sampled two times during May and June of 2007. Some springs were sampled one time only. In addition, no sampling points are depicted on Figure 1 of Attachment 1. Furthermore, springs 260A, 262A, 263A, 300, 301 and 320 are not depicted on 7-1 or any other figure. The Permittee must provide an accurate representation of what was sampled and where. The submitted baseline data is not adequate to demonstrate seasonal variation.
- The Permittee must provide baseline data information for the water rights within the proposed permit expansion as depicted on Plate 7-2, *Water Rights*. Appendix 7-1 provides the general water right information obtained through the Division of Water Rights database, however, in order for the baseline data requirement to be met, data demonstrating seasonal variation in flow and quality must be submitted to the Division. Baseline data is necessary in the event that claims are made that mining activity has impacted these resources.

R645-301-725: Baseline Cumulative Impact Area

- The application does not meet the Baseline Cumulative Impact Area requirements as outlined in R645-301-725. Without adequate baseline data, a characterization of the hydrologic resources (both surface and ground water) within the proposed permit expansion and adjacent areas is not possible. The Permittee must provide the hydrologic information necessary to assess the

probable cumulative hydrologic impacts of the proposed coal mining activity within the proposed expansion and adjacent areas.

R645-301-728: Probable Hydrologic Consequences

- The Permittee must provide a more detailed discussion (based on actual baseline data or data statistically representative of the site) as to the probable hydrologic consequences of the proposed mining activity on surface water, groundwater and water rights located within and adjacent to the proposed permit expansion.
- The Update to the Probable Hydrologic Consequences of Coal Mining at the Dugout Mine in Appendix 7-3 (PHC Update) does not discuss potential impacts to either the Cow Canyon Drainage or the un-named drainage located in Section 17 of the proposed permit expansion. Based upon their location relative to longwall activity, the Permittee must specifically address the potential for impacts to these drainages in Section 3.1.1 of the PHC Update.
- In addition, the PHC Update does not adequately discuss the impacts to groundwater resources. 5 springs (321, 260, 261, 262 and 263) are depicted on Plate 7-1 in the unnamed drainage of Section 17. 5 springs are depicted on Plate 7-1 in the Cow Canyon Drainage (211, 212, 213, 214 and 322). However, only three springs (260, 321 and 213) appear to be addressed/identified within the Hydrogeology section (2.8) of the PHC Update. The other springs are not identified nor their characteristics discussed. The Permittee must include these groundwater resources in the PHC Update and discuss the potential for them to be impacted by mining activity.
- The potential for mining related impacts to the water rights identified on Plate 7-2 need to be addressed in the Updated PHC.
- Section 2.2 of the Update To the Probable Hydrologic Consequences of Coal Mining at the Dugout Mine in Appendix 7-3, the Permittee states, "Baseline field data have been collected from surface and ground water sites in the expansion area". The submittal contains no surface water data from the proposed expansion area. The Permittee must address this discrepancy.
- Section 2.3 of the Update To the Probable Hydrologic Consequences of Coal Mining at the Dugout Mine in Appendix 7-3, the Permittee states, "The 600 acre expansion sample locations are identified on PHC Update Figure 1". The submitted Figure 1 does not depict any sampling locations. The Permittee must address this discrepancy.
- Section 2.7.2. of the Update To the Probable Hydrologic Consequences of Coal Mining at the Dugout Mine in Appendix 7-3 states, "The segments of drainages that will be undermined in

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Cow Canyon are ephemeral in nature.” However, subsequent discussions with a Dugout Canyon Mine representative revealed that the perennial flow begins in the east fork of the Cow Canyon Drainage. It was further discussed that perennial flow is evident north of the confluence of the west and east forks of the Cow Canyon Drainage in the southeast quarter of Section 16. The Permittee must clarify the aforementioned statement as to the nature and location of perennial flow in the Cow Canyon Drainage. (See aforementioned deficiency regarding baseline data for surface water).

- The last paragraph of Section 2.8.2.1 of the Update To the Probable Hydrologic Consequences of Coal Mining at the Dugout Mine in Appendix 7-3 states “Two new Colton springs have been added to the water monitoring plan for Dugout Mine. These two springs are 213 and 321.” According to Plate 7-1, *Hydrologic Monitoring Stations* and Table 7-4, *Groundwater Monitoring Program*, spring 213 is not slated for monitoring. In addition, it’s stated that Spring 213 is located in Section 22. According to Plate 7-1, Spring 213 is in section 16. The Permittee must address these discrepancies.

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R645-301-722, -731: Location and Extent of Subsurface Water

- The application does not meet the Maps, Plans and Cross Sections requirements for Subsurface Water Resource Maps as required by R645-301-722.100. Page 7-2 of the application provides a reference to Figure 7-1 of the approved MRP. Figure 7-1, *General Hydrostratigraphic Cross Section*, is labeled as “Modified from Lines (1985)”. Upon review, the Lines, 1985 technical paper is entitled “The Ground-Water System and Possible Effects of Underground Coal Mining in the *Trail Mountain* Area, Central Utah”, USGS Water Supply Paper 2259. Trail Mountain is located in the Wasatch Plateau. The Permittee offers no discussion as to how the generalized hydrogeology of the Wasatch Plateau is comparable to the Book Cliffs region where the Dugout facility is located. As required by R645-301-722.100, the Permittee should provide the appropriate cross-sections and maps that depict the “location and extent of subsurface water, if encountered, within the proposed permit or adjacent areas”. As required, the cross-sections and contour maps should also include “seasonal differences of head in the different aquifers”.

R645-301-731: Ground and Surface Water Monitoring

- The Permittee must add additional ground and surface water monitoring points. In order to make an accurate determination as to whether mining activity has impacted the ground and surface water resources within the proposed permit expansion, additional monitoring is required. Additional monitoring points will need to be added to the relevant plates and tables that outline Dugout’s water monitoring program.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

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

CLIMATOLOGICAL RESOURCE INFORMATION

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

Analysis:

The application meets the Climatological Resource Information requirements as required by R645-301-724. Climate data is provided in Appendix 4-1 of the approved MRP. The climate data includes a discussion of the climatological factors in the region of the existing permit area as well as the proposed expansion.

Findings:

The application meets the Climatological Resource Information requirements as required by R645-301-724.

GEOLOGIC RESOURCE INFORMATION

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

Analysis:

The application meets the Geologic Resource Information requirements as required by R645-301-724. The application contains updates to the plates depicting the geologic conditions within the proposed expansion area. Plate 6-1, *Geology of Dugout Canyon Mine Permit Area*, depicts the surficial geology within the proposed expansion area. Plate 6-4, *Rock Canyon Seam Overburden Thickness*, depicts the overburden above the Rock Canyon coal seam within the proposed expansion area.

Findings:

The application meets the Geologic Resource Information requirements as required by R645-301-724.

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HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Baseline Information

The application does not meet the Hydrologic Resource Information requirements as provided for in R645-301-724. The proposed permit expansion intersects two surface drainages: the Cow Canyon Drainage as well as an unidentified drainage located in T13S R13E Section 17 (unidentified drainage). The existing Dugout Canyon Mine permit area does not intersect or include these watersheds. In order for the Division to make a finding that the application has met the baseline requirements outlined in R645-301-724, the Permittee must provide data that (at a minimum) demonstrates seasonal variation in both water quality and quantity for the Cow Canyon Drainage as well as an unidentified drainage located in T13S R13E Section 17 (unidentified drainage). In order to establish seasonal variation and meet the baseline requirements, a minimum of one full calendar year of data is required. The following deficiencies were identified relative to baseline data collection requirements.

Surface Water

Plate 7-1, *Hydrologic Monitoring Stations*, depicts portions of the Cow Canyon drainage and an unidentified drainage within the proposed permit expansion area. For the purposes of this analysis the drainage located in T13S R13E Section 17 will be referred to as the "unidentified drainage". Plate 5-7, *Proposed Mine Sequence and Planned Subsidence Boundary*, depicts a portion of the Cow Canyon drainage within the boundary for potential subsidence. Page 7-18 of the application states, "Based on observations and flow data obtained during the collection of water-quality samples within the permit and adjacent areas, portions of Dugout, Fish Creek, Pace Creek and *Cow Canyon* are considered perennial within the permit area". Page 7-21 of the application states, "No stream samples have been collected from Cow Canyon since only a small portion of the watershed will be undermined and subjected to minimal subsidence".

The surface water baseline requirements (as outlined in R645-301-724.200) call for information to demonstrate seasonal variation and water usage for surface-water bodies both within the proposed permit area and the adjacent area. In addition, water quality data is necessary to establish the baseline characteristics of the resource (as outlined in R645-301-724.200). The application does not contain any flow or water quality data for the Cow Canyon Drainage or the unidentified drainage in Section 17.

The Permittee must provide data that demonstrates seasonal variation in both surface water quality and surface water quantity for the Cow Canyon and unidentified drainage located in Sections 16 and 17 respectively of the proposed permit expansion area. The Division's Tech 004-Water Monitoring guideline recommends two years of baseline data collection. In order to establish seasonal variation and meet the baseline requirements, a minimum of one full calendar year of data is required. In addition, in order to adequately assess the potential for mining related impacts on the drainage, the Permittee needs to establish where the perennial flow begins in these drainages relative to the mine plan and projected subsidence impacts.

Groundwater

The Permittee must provide additional groundwater baseline data or provide a scientifically justifiable reason for not doing so. Springs 211, 212, 213 and 214 are located within the Cow Canyon drainage. According to the approved MRP, they were sampled one time on November 21, 1998. Springs 261, 262 and 263 are located in the unidentified drainage in Section 17 and according to the approved MRP, were sampled one time on November 21, 1998. Attachment 1 of the Update to the Probable Hydrologic Consequences of Coal Mining at the Dugout Mine in Appendix 7-3 (PHC Update) contains the baseline spring field data for the proposed expansion. The spring data provided reveals that at the most, the springs were sampled two times during May and June of 2007. Some springs were sampled one time only. In addition, no sampling points are depicted on Figure 1 of Attachment 1. Furthermore, springs 260A, 262A, 263A, 300, 301 and 320 are not depicted on 7-1 or any other figure. The Permittee must provide an accurate representation of what was sampled and where. The submitted baseline data is not adequate to demonstrate seasonal variation.

The Permittee must provide baseline data information for the water rights within the proposed permit expansion as depicted on Plate 7-2, *Water Rights*. Appendix 7-1 provides the general water right information obtained through the Division of Water Rights database, however, in order for the baseline data requirement to be met, data demonstrating seasonal variation in flow and quality must be submitted to the Division. Baseline data is necessary in the event that claims are made that mining activity has impacted these resources.

Baseline Cumulative Impact Area Information

The application does not meet the Baseline Cumulative Impact Area requirements as outlined in R645-301-725. Without adequate baseline data, a characterization of the hydrologic resources (both surface and ground water) within the proposed permit expansion and adjacent areas is not possible.

The Permittee must provide the hydrologic information necessary to assess the probable cumulative hydrologic impacts of the proposed coal mining activity within the proposed expansion and adjacent areas.

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Probable Hydrologic Consequences Determination

The application does not meet the Probable Hydrologic Consequences Determination requirements as outlined in R645-301-728. R645-301-728.100 requires the Permittee to determine the probable hydrologic consequences of the proposed coal mining activity on the quality and quantity of surface and ground water. R645-301-728.200 requires that such a determination be “based on baseline hydrologic, geologic and other information”.

The Permittee must provide a more detailed discussion (based on actual baseline data or data statistically representative of the site) as to the probable hydrologic consequences of the proposed mining activity on surface water, groundwater and water rights located within and adjacent to the proposed permit expansion.

The Update to the Probable Hydrologic Consequences of Coal Mining at the Dugout Mine in Appendix 7-3 (PHC Update) does not discuss potential impacts to either the Cow Canyon Drainage or the un-named drainage located in Section 17 of the proposed permit expansion. Based upon their location relative to longwall activity, the Permittee must specifically address the potential for impacts to these drainages in Section 3.1.1 of the PHC Update.

In addition, the PHC Update does not adequately discuss the impacts to groundwater resources. 5 springs (321, 260, 261, 262 and 263) are depicted on Plate 7-1 in the unnamed drainage of Section 17. 5 springs are depicted on Plate 7-1 in the Cow Canyon Drainage (211, 212, 213, 214 and 322). However, only three springs (260, 321 and 213) appear to be addressed/identified within the Hydrogeology section (2.8) of the PHC Update. The other springs are not identified nor their characteristics discussed. The Permittee must include these groundwater resources in the PHC Update and discuss the potential for them to be impacted by mining activity.

The potential for mining related impacts to the water rights identified on Plate 7-2 need to be addressed in the Updated PHC.

Section 2.2 of the Update To the Probable Hydrologic Consequences of Coal Mining at the Dugout Mine in Appendix 7-3, the Permittee states, “Baseline field data have been collected from surface and ground water sites in the expansion area”. The submittal contains no surface water data from the proposed expansion area. The Permittee must address this discrepancy.

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Sampling and Analysis

The application meets the Sampling and Analysis requirements as outlined in R645-301-723. On page 7-4 of the approved MRP, the Permittee states "All water samples collected for use in this MRP have been analyzed according to methods in either the 'Standard Methods for the Examination of Water and Wastewater' or 40 CFR parts 136 and 434".

Findings:

The application does not meet the requirements for Hydrologic Resource Information as required by the State of Utah R-645 Coal Mining Rules. The following deficiencies must be addressed:

R645-301-724: Baseline Data Collection (Surface and Groundwater)

- The Permittee must provide data that demonstrates seasonal variation in both surface water quality and surface water quantity for the Cow Canyon and unidentified drainage located in Sections 16 and 17 respectively of the proposed permit expansion area. The Division's Tech 004-Water Monitoring guideline recommends two years of baseline data collection. In order to establish seasonal variation and meet the baseline requirements, a minimum of one full calendar year of data is required. In addition, in order to adequately assess the potential for mining related impacts on the drainage, the Permittee needs to establish where the perennial flow begins in these drainages relative to the mine plan and projected subsidence impacts.

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R645-301-725: Baseline Cumulative Impact Area

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R645-301-728: Probable Hydrologic Consequences

- The Permittee must provide a more detailed discussion (based on actual baseline data or data statistically representative of the site) as to the probable hydrologic consequences of the proposed mining activity on surface water, groundwater and water rights located within and adjacent to the proposed permit expansion.
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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:

Subsurface Water Resource Maps

The application does not meet the Maps, Plans and Cross Sections requirements for Subsurface Water Resource Maps as required by R645-301-722.100. Page 7-2 of the application provides a reference to Figure 7-1 of the approved MRP. Figure 7-1, *General Hydrostratigraphic Cross Section*, is labeled as "Modified from Lines (1985)". Upon review, the Lines, 1985 technical paper is entitled "The Ground-Water System and Possible Effects of Underground Coal Mining in the *Trail Mountain* Area, Central Utah", USGS Water Supply Paper 2259. Trail Mountain is located in the Wasatch Plateau. The Permittee offers no discussion as to how the generalized hydrogeology of the Wasatch Plateau is comparable to the Book Cliffs region where the Dugout facility is located. As required by R645-301-722.100, the Permittee should provide the appropriate cross-sections and maps that depict the "location and extent of subsurface water, if encountered, within the proposed permit or adjacent areas". As required, the cross-sections and contour maps should also include "seasonal differences of head in the different aquifers".

Findings:

The application does not meet the requirements for Maps, Plans and Cross Sections of Resource Information as required by R645-301-722, -731.

R645-301-722, -731: Location and Extent of Subsurface Water

The application does not meet the Maps, Plans and Cross Sections requirements for Subsurface Water Resource Maps as required by R645-301-722.100. Page 7-2 of the application provides a reference to Figure 7-1 of the approved MRP. Figure 7-1, *General Hydrostratigraphic Cross Section*, is labeled as "Modified from Lines (1985)". Upon review, the Lines, 1985 technical paper is entitled "The Ground-Water System and Possible Effects of Underground Coal Mining in the *Trail Mountain* Area, Central Utah", USGS Water Supply Paper 2259. Trail Mountain is located in the Wasatch Plateau. The Permittee offers no discussion as to how the generalized hydrogeology of the Wasatch Plateau is comparable to the Book Cliffs region where the Dugout facility is located. As required by R645-301-722.100, the

Permittee should provide the appropriate cross-sections and maps that depict the “location and extent of subsurface water, if encountered, within the proposed permit or adjacent areas”. As required, the cross-sections and contour maps should also include “seasonal differences of head in the different aquifers”.

OPERATION PLAN

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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:

Groundwater and Surface Water Monitoring

The application does not meet the Ground and Surface Water Monitoring requirements as required in R645-301-731.

The Permittee must add additional ground and surface water monitoring points. In order to make an accurate determination as to whether mining activity has impacted the ground and surface water resources within the proposed permit expansion, additional monitoring is required.

Findings:

The application does not meet the Ground and Surface Water Monitoring requirements as required in R645-301-731.

- **R645-301-731: Ground and Surface Water Monitoring**

- The Permittee must add additional ground and surface water monitoring points. In order to make an accurate determination as to whether mining activity has impacted the ground and surface water resources within the proposed permit expansion, additional monitoring is required.

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RECOMMENDATIONS:

The application should not be approved at this time. The aforementioned deficiencies relative to the hydrology section of the State of Utah R645-Coal Mining Rules must be addressed prior to Division approval.

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