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# TECHNICAL MEMORANDUM

## Utah Coal Regulatory Program

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May 13, 2010

TO: Internal File

THRU: Daron Haddock, Team Lead *DH*

FROM: James D. Smith, Environmental Scientist III *JDS* *17 May 2010*

RE: Winter Quarter Ventilation Facility (WQVF), Canyon Fuel Company LLC, Skyline Mine, C/0007/0005, Task ID # 3504

### SUMMARY:

Canyon Fuel Company, LLC (CFC) is planning to construct a vertical ventilation shaft, a sloped mine portal, and an emergency escape shaft at the Winter Quarters Ventilation Facility (WQVF) in Winter Quarters Canyon to facilitate expansion of the Skyline Mine into coal located north of the canyon. The surface pad for these additional entries will be constructed about 2 miles southwest of the town of Scofield in Carbon County, Utah and approximately 1/2 mile west of the historic Winter Quarters town site. The WQVF will add approximately 7.93 acres to the Skyline Mine permit area.

To prevent adverse hydrologic impacts to Winter Quarters Creek and the surrounding area, the mine will construct a runoff sediment control system that will include a sedimentation pond and ASCAs. To minimize the probability of water entering the mine, the pad for the shafts and slope is to be located, at a minimum, approximately 30 feet north of Winter Quarters Creek and 20 feet higher in elevation. The mine openings will be up-dip of the mine workings, minimizing concern of gravity discharge during the operation of the mine. Outfall -004 was added to the Skyline Mine UPDES permit in December 2009 to accommodate discharging water to Winter Quarters Creek both from the sedimentation pond and potential future mine water discharge.

The Division recently revised the interpretation of the definition of "permit area" as applying to surface disturbances only; other areas where resources are or reasonably could be expected to be adversely impacted by coal mining and reclamation operations are adjacent areas. Because of this change, CFC revised all maps in the MRP to show the permit area as the disturbed area and to show designated, defined adjacent areas.

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The amendment includes the “Winter Quarters Ventilation Shaft Pad Runoff and Sediment Control Design Report” by EarthFax Engineering and a report by Clement Drilling & Geophysical, Inc. that summarizes the methodology and results of the seismic refraction testing conducted at the WQVF site.

CFC submitted an application for the WQVF in October 2009 (Task ID # 3416). The Permittee subsequently withdrew the application in November 2009, and the Division returned the application package in November 2009. The Permittee resubmitted the application on January 11, 2010 (Task ID # 3463). The Division sent the Permittee a TA and an Application Denial letter with a list of deficiencies on February 24, 2010. The Permittee responded on March 23, 2010 (Task ID # 3504); this Tech Memo contains a review of hydrology and related issues addressed in that submittal.

Two deficiencies have been identified in this review. It is recommended that this amendment not be approved until these have been satisfactorily addressed by the Permittee:

**R645-3012-731.600, -742.111, -112, and 113,** It is unlikely that simply allowing the water to follow the roughly 150-foot long “natural” path from the riprap pad at the outfall of the ASCA 39 culvert, across the road and along the topsoil pile berm to the stream will prevent additional contributions of sediment to Winter Quarters Creek or minimize erosion.

The Division finds that operation of the WQVF as shown on the submitted plans is likely to cause or contribute to the violation of applicable water quality standards and may adversely affect the water quantity and quality or other environmental resources of Winter Quarters Creek. Before the Division can authorize coal mining and reclamation operations at the WQVF, the Permittee must finish the runoff control design and provide a plan to control the flow over the approximately 150-foot path between the riprap pad at the outfall from the ASCA 39 culvert and Winter Quarters Creek.

The Permittee must also either demonstrate that similar treatment is not needed for the flows leaving the riprap pads at the sedimentation pond spillways, the topsoil pile sediment trap, and the Upper Road culvert or provide the designs for such treatment.

**R645-301-742.120,** ASCAs 37, 38, and 39 are shown on Drawings 3.2.4-3A and 3.2.4-3B, but they are not correct on 3.2.4-3B: the Permittee must correct the ASCA outlines on Drawing 3.2.4-3B.

In addition, as a condition of receiving approval for this application, the Permittee needs to analyze water samples collected at WQ1-1 and CS-24 for baseline water quality parameters until construction of the WQVF begins.

**TECHNICAL ANALYSIS:**

**ENVIRONMENTAL RESOURCE INFORMATION**

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

**HYDROLOGIC RESOURCE INFORMATION**

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

**Analysis:**

**Sampling and Analysis**

Table 2.3.7-1 shows the monitoring schedule and Table 2.3.7-2 lists Baseline and Operational monitoring parameters: during the 1<sup>st</sup> Quarter, only 9 out of 28 stream sites are monitored, JC-1 is the only well monitored, and no data are collected at springs.

The Division's directive Tech-004 recommends a full year of baseline hydrology data be submitted with an application. The Permittee first submitted the application for the WQVF in October 2009, subsequently withdrew it, and then resubmitted it in January 2010. The Division's database contains data (including baseline parameters) for the 4<sup>th</sup> Quarter 2009 at CS-24, located on Winter Quarters Creek below the WQVF site. For WQ-1, the Permittee has uploaded Operational parameters to the Division's database for the 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> Quarters of 2008 and the 2<sup>nd</sup> Quarter 2009, but only field parameters have been reported since (3<sup>rd</sup> and 4<sup>th</sup> Quarters of 2009). The Permittee reported depth at 08-5-1 in 4<sup>th</sup> Quarter 2009, with no subsequent measurements reported. Do to the potentially critical health and safety issues and time constraints involved with this application, the Division is willing to be flexible in applying the Tech-004 guidelines, however, as a condition of receiving approval for this application, the Permittee needs to provide additional baseline water quality analyses for WQ1-1 and CS-24.

**Baseline Cumulative Impact Area Information**

The Division prepared a CHIA for the Mud Creek and Upper Huntington Creek Basins; the Division last updated it in March 2006. That CHIA encompassed Winter Quarters Canyon, but there is no discussion of possible impacts from disturbance in this canyon. Therefore, the Division will need to update the CHIA to include the proposed disturbance in Winter Quarters Canyon. The Skyline Mine WQVF is the only proposed or anticipated mining activity in the Winter Quarters drainage.

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### **Probable Hydrologic Consequences Determination**

The mine openings at the shafts and slope are to be located up-dip of the mine workings, eliminating gravity discharge during the operation of the mine; however, if needed, mine water can be discharged from this location if UPDES discharge parameters are met. Discharge outfall -004 was added to the UPDES permit in 2009 to accommodate the discharging of water from the sedimentation pond and the mine to Winter Quarters Creek.

The WQVF decline slope portal, at an elevation 8,120 feet, will be at a lower elevation than portions of the mine workings (the Trespass Portal, at an elevation of 8,580 feet, is currently the lowest portal in Eccles Canyon). Because of this lower elevation, gravity discharge from the WQVF would be a possibility at the time mine dewatering were to cease and reclamation begin. Previous versions of the WQVF plan called for gravity discharge from the shafts and tunnel after reclamation, but that is no longer planned. To safeguard against such a gravity discharge, the Permittee will seal and backfill both the shafts and slope to prevent discharge (Sections 4.9 and 4.11.9).

Flow data for CS-20 in the Division's database show an average flow of 614 gpm in Winter Quarters Creek, with 2,800 and 108 gpm being the measured maximum and minimum. Appendix A-1, Volume 2 contains a FlowMaster study conducted by Earthfax Engineering. It indicates that Winter Quarters Creek can discharge as much as 9,000 gpm (6,200 gpm mine discharge plus 2,800 gpm streamflow) without exceeding erosive velocity (5 fps) in the creek. In the event discharge from Outfall -004 routinely exceeds 6,200 gpm, the Permittee commits to additional armoring to the outfall location and investigation of the impacts to Winter Quarters creek (Sections 2.4.2 and Section 2.5.2).

### **Surface-Water Monitoring Plan**

Monitoring Program is in Section 4.11.2. Surface water monitoring will continue throughout the mining and reclamation operations, following the monitoring schedule in Sections 2.3.7 and 2.4.4. Quarterly sampling will be analyzed according to Tables 2.3.7-1 and 2.3.7-2. Postmining data collection will continue at each of the stations until reclamation is determined to be successful.

### **Findings:**

**R645-301- 724.200**, As a condition of receiving approval for this application, the Permittee should analyze water samples collected at WQ1-1 and CS-24 for baseline water quality parameters until construction of the WQVF begins.

## OPERATION PLAN

### 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:

##### Coal Mine Waste

Waste material generated from the Winter Quarters Ventilation Facility (WQVF) Declined Slope will be used to create the facility pad itself. Material will be placed in lifts and compacted and reinforced with a retaining wall. In the event there is an excess of material that cannot be stored on site, whether from the Declined Slope or Vertical Shaft construction, this material will be transported to the Scofield Waste Rock site. Material sent to the Scofield Waste Rock site will be analyzed for toxicity approximately every 2,000 tons of material sent to the site. Waste Rock generated from construction of the Vertical Shaft using the raised-bore drilling technique will likely be placed underground.

#### Findings:

Information on Spoil and Waste Materials is sufficient to meet the requirements of the Utah Coal Mining Rules.

### 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:

##### Groundwater Monitoring

No springs exist on the south facing slope where the WQVF pad is located. Spring WQ1-1 is located on the north-facing slope, is approximately 1/4-mile east of the WQVF pad, and monitors near-surface ground water south and east of the WQVF site (p. 2-35c).

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### **Surface Water Monitoring**

The Permittee proposes to monitor surface-water in the vicinity of the WQVF at two sites, CS-20 and CS-24 to ensure the operation is not compromising the surface water system. CS-20 is located upstream of the site. Stream monitoring station CS-24 was added to the monitoring plan for Winter Quarters Canyon; however, CS-24 was originally near the midpoint of the WQVF pad - not downstream of it - and upstream of the proposed Topsoil Pile Sediment Trap. The Permittee has relocated CS-20 approximately 500 feet farther down stream so it is unquestionably downstream of the WQVF. The area monitored by this new location includes an 80-acre tributary drainage located on the south slope opposite the WQVF pad (Drawings 2.3.6-1 and 3.2.4-3B).

### **Acid- and Toxic-Forming Materials and Underground Development Waste**

No new analyses of coal or overlying and underlying rock were done in preparation for the WQVF application. Testing of such materials in other areas of the mine has not identified potential acid- or toxic- forming problems, although tests on underground development waste taken to the Scofield Waste Rock Disposal Site have indicated possible acid-forming potential. (Section 4.4.5). Waste material generated from the WQVF slope, and possibly from the vertical shafts, will be used as fill material to create the facility pad itself. Material will be placed in lifts and compacted and reinforced with a retaining wall. Excess material that cannot be stored on site will be transported to the Scofield Waste Rock site. All mine development waste will be tested for toxicity and acid generating potential at a rate of one sample per 2,000 tons. Materials found to be toxic will be moved to the permanent disposal site. Approximately 8,000 cubic yards of material are anticipated to be generated from the slope and 4,050 cubic yards from the shafts if they are sunk from the surface. If the raise-bore technique is used for the construction of the shafts, very little material will be stored at the surface. At reclamation, the development waste will be used in backfilling of the slope and vertical shafts. To achieve AOC, additional material will be brought from the Waste Rock site or purchased from an outside source (Sections 4.4.5 and 4.16.2).

### **Gravity Discharges from Underground Mines**

The Winter Quarters decline slope portal is at an elevation of 8,120 feet, which is approximately 460 feet below the lowest portal in Eccles Canyon (the Trespass Portal at 8,580 ft.). The mine openings at the shafts and slope are to be located up-dip of the mine workings, greatly reducing the possibility of gravity discharge during the operation of the mine; however, if needed during mine operation, mine water can be discharged from this location if UPDES discharge parameters are met.

### **Water-Quality Standards and Effluent Limitations**

In December 2009, as part of the UPDES water discharge permit renewal, outfall -004 was added in Winter Quarters Canyon in anticipation of the WQVF construction. Outfall -004 is permitted to discharge both storm water and mine water.

### **Diversions: Miscellaneous Flows**

Section 4.5 of Attachment A of Vol. 5 - Section 24; *Winter Quarters Ventilation Shaft Pad Runoff and Sediment Control Design Report* states that "The ASCA [39] catch basin will convey runoff into an 18-inch culvert under the access road and into a riprap pad along the north side of the existing road south of the access road. The riprap pad will dissipate flow and allow the runoff to flow along its natural path across the existing road. From the south side of the existing road runoff will flow west along the north side of the topsoil berm toward Winter Quarters Creek." Simply allowing the water to follow its "natural path" across the road and along the topsoil pile berm will not minimize erosion and contributions of sediment to Winter Quarters Creek; the "natural path" would be overland flow, not the concentrated flow that will emerge from the riprap pad and be contained and concentrated along the topsoil berm. The Permittee needs to design a means to convey the water from the ASCA 39 outfall to the stream that will prevent additional contributions of sediment to the stream and minimize erosion.

Similarly, the outflows from the sedimentation pond spillways, topsoil pile sediment trap, and the Upper Road culvert probably need a means to convey the water from the riprap pads to the stream in order to minimize erosion and contributions of sediment to the stream.

### **Stream Buffer Zones**

All water leaving the pad area will be treated by the sedimentation pond. A UPDES water discharge point was added to the Skyline Mine water discharge permit in December 2009 to accommodate discharging water to Winter Quarters Creek both from the sedimentation pond and potential future mine water discharge. Silt fence provides sediment control for the runoff from ASCA 38, the outslope of the pad, and sedimentation pond.

Wattles placed around the inlet of a catch basin will treat discharge from ASCA 39. From the catch basin, water will flow through a culvert under the road and discharge onto a riprap pad, which will dissipate the flow. The Permittee asserts that the runoff will then flow along its "natural path" across the road, west along the north side of the topsoil berm, and to Winter Quarters Creek. It is unlikely that simply allowing the water to follow this "natural" path for roughly 150 feet across the road and along the topsoil pile berm will not result in additional contributions of sediment to Winter Quarters Creek or minimize erosion.

Similarly, the plans do not show sediment control between Winter Quarters Creek and the outfalls from the sedimentation pond spillways, the topsoil sediment trap and Upper Road ditch and culvert.

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The Division finds that operation of the WQVF as shown on the submitted plans is likely to cause or contribute to the violation of applicable water quality standards and may adversely affect the water quantity and quality or other environmental resources of Winter Quarters Creek. Before the Division can authorize coal mining and reclamation operations at the WQVF, the Permittee must finish the runoff control design and provide a plan to control the flow over the approximately 150-foot path from the riprap pads at the outfall from the ASCA 39 culvert to Winter Quarters Creek. The Permittee must also either demonstrate that similar treatment is not needed for the flows leaving the riprap pads at the sedimentation pond spillways, the topsoil pile sediment trap, and the Upper Road culvert or provide the designs for such treatment.

### **Sediment Control Measures**

The Permittee commits that prior to construction of the WQVF, silt fencing or similar best management practice will be installed along the entire length of the construction zone to minimize sediment and debris from entering the creek. Once construction is complete and other sediment controls are installed, these sediment control structures will be removed. During the life of the WQVF pad, long term sediment control will be implemented thorough a sediment pond and outfall UPDES-004, and ASCAs (Sections 2.7.8 and 3.2.11(b)).

### **Siltation Structures: Exemptions**

The road above the WQVF site and the adjacent ditch are pre-mining features that will be improved during mine operation and retained for PMLU. The culvert to be built to carry runoff from the ditch to the creek is also to be left at reclamation. These structures were designed to handle runoff from a 100-year, 6-hour precipitation event (*Sediment Control Design Report*). Because they carry water only from areas in which the only coal mining operations are the road, diversion ditch, and culvert themselves and for which the upstream area is undisturbed, this road, ditch, and culvert are not included in the Disturbed Area for the rules applying to siltation structures (R645-100.200 "Disturbed Area"); however, they are not exempt from the remaining reclamation rules. Ark Land Company is (or is to be, according to the application) the landowner, with an inter-company perpetual and exclusive lease with Canyon Fuel Company, LLC. - Skyline Mine (Section 114). Therefore, the landowner is preparing the reclamation plan and PMLU plans and thereby accepting responsibility for the post-mining maintenance of these features; leaving this road, ditch and culvert is compatible with the PMLU.

### **Impoundments**

The Sedimentation pond is to be a temporary impoundment. It will not meet the size or other criteria of 30 CFR Sec. 77.216(a) nor be located where failure would be expected to cause loss of life or serious property damage. The design is in the *Sediment Control Design Report*.

Section 3.2.1 states that an engineer's certification to meet requirements of R645-301-743-110 and R645-301-514 is located on all necessary designs and calculations for the ponds in the appropriate appendices and inspection reports: no such certification for the WQVF sedimentation pond is found in the *Sediment Control Design Report* but the Permittee has committed that all required certifications will be included with the clean copies of the application.

Drawing 3.2.4-3D indicates a 1.45-foot freeboard above the primary spillway elevation; however, the information used to determine that this freeboard is sufficient to prevent overtopping by waves or sudden increases in storage volume could not be found in the submittal. "Rule-of-thumb" guidelines for pond freeboard range from 1 to 3 feet; as this is a small pond that treats runoff from a small area (3.7 acres: *Sediment Control Design Report* and Drawing 3.2.4-3G), 1.45-foot freeboard is probably adequate.

#### **Ponds, Impoundments, Banks, Dams, and Embankments**

The sedimentation pond, topsoil sediment trap, and ASCAs are described in Chapter 4 of the *Sediment Control Design Report*. Drawings 3.2.4-3A and 3.2.4-3B show the locations of the sedimentation pond and ASCAs, but ASCAs 37 and 38 are not shown correctly on Drawing 3.2.4-3B. Drawing 3.2.4-3D shows the plan of the sedimentation pond, including cross sections, and Drawing 3.2.4-3F shows details for silt fencing, catch basins, and sediment traps used for the ASCAs.

#### **Findings:**

**R645-3012-731.600, -742.111, -112, and 113,** It is unlikely that simply allowing the water to follow the roughly 150-foot long "natural" path from the riprap pad at the outfall of the ASCA 39 culvert, across the road and along the topsoil pile berm to the stream will prevent additional contributions of sediment to Winter Quarters Creek or minimize erosion.

The Division finds that operation of the WQVF as shown on the submitted plans is likely to cause or contribute to the violation of applicable water quality standards and may adversely affect the water quantity and quality or other environmental resources of Winter Quarters Creek. Before the Division can authorize coal mining and reclamation operations at the WQVF, the Permittee must finish the runoff control design and provide a plan to control the flow over the approximately 150-foot path between the riprap pad at the outfall from the ASCA 39 culvert and Winter Quarters Creek.

The Permittee must also either demonstrate that similar treatment is not needed for the flows leaving the riprap pads at the sedimentation pond spillways, the

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topsoil pile sediment trap, and the Upper Road culvert or provide the designs for such treatment.

**R645-301-742.120**, ASCAs 37, 38, and 39 are shown on Drawings 3.2.4-3A and 3.2.4-3B, but they are not correct on 3.2.4-3B: the Permittee must correct the ASCA outlines on Drawing 3.2.4-3B.

## 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:

#### Certification Requirements

The MRP states on page 3-15 that "An engineer's certification to meet requirements of R645-301-743-110 and R645-301-514 is located on all necessary designs and calculations for the ponds in the appropriate appendices and inspection reports. A copy of this certification will be retained at the minesite." The calculations and designs in Engineering Calculations Vol. 5 - Section 24; *Winter Quarters Ventilation Shaft Pad Runoff and Sediment Control Design Report* by EarthFax Engineering are not certified; however, the Permittee has committed that all required certifications will be included with the clean copies of the application.

### Findings:

Information on Map, Plans, and Cross-sections of Mining operations is sufficient to meet the requirements of the Coal Mining Rules.

## RECLAMATION PLAN

### HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

### Analysis:

### **Hydrologic Reclamation Plan**

The amendment states on page 4-78(a) that the WQFV sedimentation pond will be removed during Phase II reclamation. Alternate sediment control measures such as silt fences, straw bales and check dams will be used until the area is vegetated and runoff meets applicable standards.

Previous versions of the WQVF plan called for gravity discharge from the shafts and tunnel after reclamation, but that is no longer planned. To safeguard against such a gravity discharge, the Permittee will seal and backfill both the shafts and slope to prevent discharge. The sealing plan, including drawings, is in Sections 4.9 and 4.11.9.

#### **Findings:**

### **MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS**

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

#### **Analysis:**

##### **Reclamation Treatments Maps**

According to the information in the amendment, the ditch along the road above the WQVF and the culvert that carries water from the ditch towards the creek are to be considered permanent and left after reclamation. They are shown on Drawing 4.4.2-3A.

#### **Findings:**

Maps, Plans, and Cross Sections of Reclamation Operations are sufficient to meet the requirements of the Coal Mining Rules.

### **RECOMMENDATIONS:**

The Division should not approve this amendment until Permittee has satisfactorily addressed the deficiencies listed above.