

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

February 18, 2010

TO: Internal File

THRU: Daron Haddock, Team Lead *NOA*

FROM: James D. Smith, Environmental Scientist III *JS 02/24/10*

RE: Winter Quarter Ventilation Facility (WQVF), Canyon Fuel Company LLC, Skyline Mine, C/0007/0005, Task ID # 3463

SUMMARY:

Canyon Fuel Company 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.

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 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 Skyline Mine Winter Quarters site.

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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.

CLIMATOLOGICAL RESOURCE INFORMATION

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

Analysis:

Climatological Resource Information is in the current MRP. No new climatological data have been submitted with this amendment; however, Attachment A contains Precipitation Frequency Estimates from NOAA (<http://hdsc.nws.noaa.gov/cgi-bin/hdsc>).

Findings:

Climatological Resource Information meets the requirements of the Coal Mining Rules.

ALLUVIAL VALLEY FLOORS

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

Analysis:

Alluvial Valley Floor Determination

The stream flows through a V-shaped valley with steep side-slopes. Nevertheless, the stream has developed a narrow floodplain. The gentle meanders of the stream are evident on topographic maps, and the Clement Drilling and Geophysical seismic refraction report states that refraction profiles 1 and 3 show evidence of past lateral migration of the stream. There is no evidence of irrigation other than natural flooding, but water in the stream provides natural subirrigation.

Applicability of Statutory Exclusions

The extent of agricultural activity, i.e. rangeland, on the proposed permit and adjacent area is not known; however, the total area for the proposed WQVF permit area will be less than 8

acres, and not all of the 8 acres will be disturbed. The area of the potential AVF that may be disturbed is estimated by the Division to total approximately one acre. The stream is the south boundary of the proposed permit area but the stream itself should not be disturbed by the planned mining and reclamation activities. There is no indication that the proposed disturbance will interfere with essential hydrologic functions inside or outside the permit area. The Division finds that the Statutory Exclusions of R645-301-324.220 apply and will make no further determination as to the presence of an AVF.

Findings:

The Division finds that the Statutory Exclusions of R645-301-324.220 would apply if there were an AVF and will make no further determination as to the presence of an AVF.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Sampling and Analysis

The Permittee recently added stream monitoring point CS-24 (Nov 2009 – one sample), spring WQ1-1 (June 2008 – six samples), and well 08-5-01 (Nov 2009 – depth only; one sample) in the vicinity of the proposed WQVF in anticipation of the WQVF submittal. These have been added to the monitoring schedule in Tables 2.3.7-1 and 2.3.7-3.

Analyses at WQ1-1 have been for Field or Operational rather than Baseline parameters, which are listed in Table 2.3.7-2 of the current MRP. The Permittee needs to analyze water samples from WQ1-1, 08-5-1, and CS-24 for the baseline parameters that are listed in Table 2.3.7-2.

Baseline Information

The Permittee has already provided some baseline geologic and hydrologic data for the Winter Quarters Canyon area in the current MRP. Additional baseline is being gathered at the three points discussed in the preceding section; however, see the preceding deficiency

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,

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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.

In order for the Division to update the CHIA determination, the Permittee must provide information on the potential for acid- and toxic forming materials in the underground development waste that will be generated during construction of the shafts and slope and placed adjacent to the stream in the WQVF pad.

Modeling

No modeling was done for this amendment.

Probable Hydrologic Consequences Determination

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.

In Section 4.11.9, the Permittee states that the WQFV decline slope portal (elevation 8,120 feet) is approximately 460 feet below the Trespass Portal (8,580 feet), currently the lowest portal in Eccles Canyon. Because of this lower elevation, gravity discharge from the WQVF is likely when mine dewatering ceases and reclamation begins. The Permittee estimates Winter Quarters could receive "500-600 gallons of water" from the reclaimed WQVF, with an estimated TDS concentration in the range of 500-700 mg/L. It can be assumed that the additional flow is 500 – 600 gpm, but the Permittee needs to clarify this.

Flow data in the Division's database for CS-20 show an average flow of 614 gpm in Winter Quarters Creek, with 2,800 and 108 gpm being the measured maximum and minimum. Based on this limited knowledge of the creek, adding 500 to 600 gpm of sediment-free water to this stream has the potential to markedly change its character. The Permittee must address flooding and streamflow alteration from this significant inflow to Winter Quarters Creek in the PHC.

The Permittee anticipates the untreated water quality will comply with performance standards of R645-301, R645-302 and any additional UPDES permit requirements. Discharge

pipe details are in Section 4.9 and Figure 4.90. Because the majority of this groundwater would not naturally discharge to the surface in the immediate area, this discharge should not produce a significant depletion of water reaching the surrounding creeks and springs since these water sources (creeks and streams) are located stratigraphically above the in-mine water source. Groundwater intercepted and discharged into Winter Quarters Creek would be consistent with the groundwater gradient information submitted in the PHC - generally to the north-northeast (PHC Volumes July 2002 and October 2002).

Groundwater Monitoring Plan

The Permittee recently added spring WQ1-1 (June 2008 – six samples) and well 08-5-01 (Nov 2009 – depth only; one sample) in the vicinity of the proposed WQVF in anticipation of the WQVF submittal. These have been added to the monitoring schedule in Tables 2.3.7-1 and 2.3.7-3.

Surface-Water Monitoring Plan

The Permittee recently added stream monitoring point CS-24 (Nov 2009 – one sample to date) in the vicinity of the proposed WQVF in anticipation of the WQVF submittal. These have been added to the monitoring schedule in Tables 2.3.7-1 and 2.3.7-3.

In Section 4.11.2, Monitoring Program, the last sentence (which has been updated) in the paragraph near the center of page 4-68 is unclear: “Quarterly samplings will continue to be analyzed according to Table 2.3.7-1 during the postmining period. The remaining samples are per Table 2.3.7-2.” This seems to be an “apples-oranges” comparison, as Table 2.3.7-1 gives the sampling schedule and Table 2.3.7-2 lists the monitoring parameters. The Permittee needs to clarify this statement.

Findings:

R645-301-120.200, The Permittee estimates Winter Quarters could receive “500-600 gallons of water” from the reclaimed WQVF. It might be assumed that the additional flow is 500 – 600 gpm, but the Permittee needs to clarify this.

R645-301-120.200, In Section 4.11.2, Monitoring Program, the last two sentences in the paragraph near the center of page 4-68 are unclear: “Quarterly samplings will continue to be analyzed according to Table 2.3.7-1 during the postmining period. The remaining samples are per Table 2.3.7-2.” Table 2.3.7-1 gives the sampling schedule and Table 2.3.7-2 lists the monitoring parameters. The Permittee needs to clarify this statement.

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R645-301-728.333, Flow data in the Division's database for CS-20 show an average flow of 614 gpm in Winter Quarters Creek, with 2,800 and 108 gpm being the measured maximum and minimum. Discharging 500 to 600 gpm of sediment-free water to this stream has the potential to markedly change its character. The Permittee must address flooding and streamflow alteration from this significant inflow to Winter Quarters Creek in the PHC.

R645-301-732.210, -731.220, The Permittee needs to analyze the water samples from WQ1-1, 08-5-1, and CS-24 for the baseline parameters that are listed in Table 2.3.7-2.

R645-301-725.200, (See previous deficiency under Baseline Cumulative Impact Area Information).

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

Drawing 2.3.6-1 shows the water monitoring locations.

Surface Water Resource Maps

Drawings 2.3.5.1-1 and 2.3.5.2-1 show, respectively, the locations for water rights on surface and ground water.

Well Maps

Other than the Permittee's deep groundwater well 08-1-5, the Division is not aware of any wells near the proposed WQVF. Drawing 2.3.6-1 shows the location of 08-1-5 and other wells associated with the Skyline Mine.

Findings:

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

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:

R645-301-725.200, (See previous deficiency under Baseline Cumulative Impact Area Information).

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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 Monitoring

Spring WQ1-1 monitors near surface groundwater in the vicinity of the WQVF (p. 2-35c). No springs are located in the immediate vicinity of the WQVF site (Section 2.3.4.4). The

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Permittee needs to clarify where this spring is in relation to the WQFV and what information it will provide on the groundwater at the WQVF.

The paragraph about monitoring that has been added on page 2-35c mentions well 08-1-5 that is screened from 297-317 feet to monitor the water elevation below the coal seam in the vicinity of the WQVF, then the last sentence refers to a "deep groundwater well" that will monitor the aquifer below the coal seam. Other information in the amendment indicates that there is only one groundwater monitoring well, but the double description on page 2-35c is confusing, giving the impression that there are two wells. The Permittee needs to clarify the language regarding the groundwater monitoring well on page 2-35c.

Surface Water Monitoring

The Permittee proposes to monitor surface-water in the vicinity of the winter Quarters ventilation Facility (WQFV) at two sites, CS-20 and CS-24 to ensure the shaft and slope are not compromising the surface water system. Stream monitoring station CS-24 was added in Winter Quarters Canyon with the addition of sediment pond discharge point UPDES-004, which is the sampling point for discharge from the WQVF pad site. CS-20 is located upstream of the site; however, CS-24 is near the midpoint of the WQVF pad, not down stream of it, and it is upstream of the Topsoil Pile Sediment Trap (Drawings 2.3.6-1 and 3.2.4-3B). The Permittee needs to either move CS-20 farther down stream or add another surface-water monitoring point that is unquestionably downstream of the WQVF.

Sampling frequency and analysis are located in Tables 2.3.7-1, and 2.3.7-2, respectively, and Table 2.3.7-3 contains information on Monitoring Station Identification. Tables 2.3.7-1 and 2.3.7-3 have been updated for this amendment.

Acid- and Toxic-Forming Materials and Underground Development 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.

In order for the Division to update the CHIA determination, the Permittee must provide information on the potential for acid- and toxic forming materials in the underground development waste that will be generated during construction of the shafts and slope and placed

adjacent to the stream in the WQVF pad (see previous deficiency under Baseline Cumulative Impact Area Information).

Transfer of Wells

The Permittee makes no mention of transferring wells.

Discharges Into an Underground Mine

The Winter Quarters Ventilation Facility design includes the locations of the declined slope, exhaust shaft, emergency escapeway shaft, sediment pond, and drainage plan for both the disturbed and undisturbed drainage. The pad is located a minimum of approximately 30 feet north of Winter Quarters Creek and approximately 20 feet higher in elevation to minimize water entering the mine. The mine openings (shafts/slope) are located up dip of the mine workings, eliminating concern of any gravity discharge during the operation of the mine. Initially, mine water can be discharged from this location when discharge parameters are met. 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 potentially future mine water discharge. (Section 4.11.9)

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.). Due to the elevation change, a gravity discharge from the mine is likely at reclamation. In the absence of building bulkheads within the mine at various locations to prohibit gravity discharge, Winter Quarters Creek has the potential to receive an additional 500-600 gallons of water with an estimated TDS concentration in the range of 500-700 mg/L. The Permittee anticipates that the untreated water quality will comply with performance standards of R645-301, R645-302, and any additional UPDES permit requirements (Section 4.11.9); however, the Division cannot approve the plan as presented until the Permittee **demonstrates** that the discharge will with the performance standards of R645-301 and R645-302 and any additional UPDES permit requirements. Because this discharge is likely after reclamation, when no treatment will be possible, the Permittee must demonstrate that untreated water will meet these standards.

The Permittee thinks that because the majority of this groundwater would not naturally discharge to the surface in the immediate area, no significant depletion will occur in the amount of water reaching the surrounding creeks and springs as these are located stratigraphically above the in-mine water source. Further, any groundwater intercepted and discharged into Winter

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Quarters Creek would be consistent with the groundwater gradient information submitted in PHC Volumes July 2002 and October 2002 - generally to the north-northeast (Section 4.11.9).

Water-Quality Standards and Effluent Limitations

In order for the Division to allow gravity discharges of water from an underground mine, the Permittee must demonstrate that the discharge complies with the performance standards of R645-301 and R645-302 and any additional UPDES permit requirements. Because this discharge is likely after reclamation, when no treatment will be possible, the Permittee must demonstrate that untreated water will meet these standards. The Division cannot approve the plan as presented until this information is provided.

Diversions: General

The runoff conveyance system for the sedimentation pond, topsoil stockpile, and ASCA will be temporary, and were designed using the 10-year, 24-hour storm event..

Diversions: Perennial and Intermittent Streams

There is to be no diversion of perennial or intermittent streams or of ephemeral streams draining an area greater than 1 square mile.

Diversions: Miscellaneous Flows

Section 4.3 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 flow in this area would be overland flow, not the concentrated flow that will emerge from the riprap pad. The Permittee needs to design a means to convey the water from the outfall to the stream in order to minimize erosion and contributions of sediment to the stream.

Similarly, although they are not discussed in the *Sediment Control Design Report*, the outflows from the Sedimentation Pond spillways and the Upper Road culvert need a means to convey the water from the outfall to the stream in order to minimize erosion and contributions of sediment to the stream.

Stream Buffer Zones

Winter Quarters Creek, a small perennial stream, forms the south boundary of the proposed permit area. The stream itself should not be disturbed by the planned mining and reclamation activities for the WQVF, but some activities will be within 100 feet of this stream, including the Power Substation, Ventilation Shaft, Escape Shaft, and Slope Portal (Drawing 3.2.4-3A). The Permittee states to have purposefully designed the pad to minimize potential impacts to the stream by maintaining a minimum of two stream widths (approximately 24 feet) from the stream, thereby avoiding direct impacts to the stream and riparian areas.

The Permittee monitors macroinvertebrates to determine the health of the stream; however, the monitoring points on Winter Quarters Creek are upstream of the WQVF. Plate 2.8.1-1 shows the monitoring locations, and Table 2.8-1a gives the monitoring frequency.

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.

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 along the north side of the existing road. The riprap pad will dissipate flow and allow the runoff to flow along its natural path across the road, west along the north side of the topsoil berm, and to Winter Quarters Creek. However, simply allowing the water to follow this "natural" path across the road and along the topsoil pile berm will not minimize erosion and contributions of sediment to Winter Quarters Creek.

Similarly, the plans do not show sediment control for the outslope of the Sedimentation Pond and Topsoil Pile berm and the outfall from the Topsoil Sediment Trap and Upper Road ditch and culvert.

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 within the Stream Buffer Zone, the Permittee must provide a plan to prevent violation of applicable water quality standards and adverse impacts to the water quantity and quality or other environmental resources of Winter Quarters Creek.

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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 siltation structures will be removed. During the life of the WQVF pad, long term sediment control will be implemented through a sediment pond and outfall UPDES-004, and ASCAs (Sections 2.7.8 and 3.2.11(b)).

Siltation Structures: General

A single sedimentation pond is the only Siltation Structure (defined at R645-100-200 as a sedimentation pond, series of sedimentation ponds, or other treatment facility) proposed for the WQVF.

Siltation Structures: Sedimentation Ponds

The design drawings for the Winter Quarters pond are shown in Map 3.2.4-3D. Watersheds reporting to the pond are shown on Drawing 3.2.4-3G. The pond will be constructed from native or imported materials, not from coal mine waste rock (Chapter 2, *Sediment Control Design Report*).

A sediment pond will be located near the middle of the WQVF site. Design information and calculations are in the *Sediment Control Design Report*. The pond is designed to contain the runoff from a 10-year, 24-hour storm event in addition to sediment yielded from its catchment area, approximately 3.69 acres (1.18 acres of disturbed area from the facility and 2.52 acres of undisturbed area above the site). See Plate 3.2.43D for pond designs and Winter Quarters Ventilation Shaft Pad Runoff and Sediment Control Design Report - Volume 5, Section 24 for calculations.

The sediment level will be determined by cross sectioning the sediment level through B-B' on Map 3.2.1-2B and through A-A on Map 3.2.1-4 at no greater than 3 year intervals. During sediment clean out the pond may be drained of all water that will meet permit requirements. Water not meeting discharge requirements will be hauled to the other sediment pond. Mine water discharge during clean out of the mine site sediment pond shall by-pass the pond but shall still meet UPDES Discharge Permit requirements. Sediment will be disposed of as outlined in Section 4.16 (Section 3.2.1).

The area under the sedimentation ponds will not be subsided. All ponds are to be operated in accordance with UPDES Discharge Permit conditions. Operations affecting the UPDES Discharge Permit, which are not clearly defined in the permit, are to be coordinated with the Division of Environmental Quality. The Permittee will operate the ponds in a prudent manner

and will attempt to reduce the sediment loading to the receiving waters into Eccles Creek. Pond decanting will be utilized to minimize sediment loading into the receiving stream. When decanting operations are conducted, they will conform with applicable water quality standards including exercising the settleable solids measurement option of the UPDES Discharge Permit during periods of storm runoff or snowmelt (Section 4.13.1).

Siltation Structures: Other Treatment Facilities

No "Other Treatment Facilities" are proposed.

Siltation Structures: Exemptions

The ditch along the road above the Facility and the culvert that carries water from the ditch to the creek are to be left at reclamation.

Because they carry water only from areas in which the only coal mining operation is 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 sedimentation ponds (R645-100.200 "Disturbed Area"); however, they are not exempt from reclamation rules. Ark Land Company is (or is to be) the landowner, and the plan is to conduct an inter-company perpetual and exclusive lease with Canyon Fuel Company, LLC. - Skyline Mine (Section 114); therefore, leaving this road, ditch and culvert appears to be compatible with the post mining land use (PMLU).

Discharge Structures

The primary and emergency spillways were designed using a 10-year, 24-hour and 25-year, 6-hour rainstorm events. Peak Stage during the 10-year, 24-hour event was determined to fill the pond to the elevation of the primary spillway (8075.05 feet). A 25-year, 6-hour event immediately following the 10-year, 24-hour event would discharge at a rate of 1.15 cfs with a velocity of 3.67 fps.

The emergency spillway will not normally discharge during the design runoff events. However, assuming the primary spillway was not functioning and the pond was assumed full to the emergency spillway crest (8,075.55 ft) prior to the occurrence of a 25-year, 6-hour storm event, the emergency spillway is calculated to discharge 0.84 cfs with a velocity of 3.35 fps at the crest. This velocity is considered non-erosive. The required volume for annual sediment storage has been estimated at 1,108 cubic feet. The 60 percent sediment volume is at an elevation of 8,071.7 feet. The 100 percent sediment 'clean-out' marker is at an elevation of 8,072.2 feet which corresponds to the elevation of the 6-inch diameter decant pipe (Section 3.2.1).

Impoundments

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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*.

Drawing 3.2.4-3D indicates a 1.45-foot freeboard above the primary spillway elevation; however, the calculations or other design 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.

Stability of the foundations and abutments for the sedimentation pond is addressed in Attachment C of the. The Winter Quarters Ventilation Facility pond embankment is to be built according to designed specifications. Engineering Calculations are located in the *Sediment Control Design Report*, Volume 5, Section 24 and illustrated on Map 3.2.4-3h (Section 4.13.1).. The sedimentation pond relies primarily on storage to control the runoff from the applicable design precipitation event, but has a combination of principal and emergency spillways. Design of the spillway is discussed above.

The four sediment ponds are to be inspected, at a minimum, once each calendar quarter for structural weakness, erosion, and other hazardous conditions, and any deficiencies found are to be reported to DOGM. Reports are to be kept at the mine office and to be available upon request (Section 4.13.1).

Ponds, Impoundments, Banks, Dams, and Embankments

The amendment and MRP contain hydrologic and geologic information required to assess the hydrologic impact of the sedimentation pond. Attachment A of Vol. 5 - Section 24; *Winter Quarters Ventilation Shaft Pad Runoff and Sediment Control Design Report* contains information on storm frequency and duration, hydrographs for the watersheds, and hydrology-soil groups. Chapter 2 of Attachment C contains a brief statement on the geology of the Ventilation Shaft pad. The same geologic and hydrogeologic conditions are anticipated to occur in the North Lease as occurred in the northern portion of the existing permit area (p. 2-51g). Geologic Resource Information is in the current MRP.

The sedimentation pond does not meet the size of other criteria of 30 CFR Sec. 77.216(a) and is located where failure would not be expected to cause loss of life or serious property damage. All embankments surrounding the pond have been evaluated for slope stability. They have been designed with a minimum factor of safety of 1.3 against rotational shear failure when

the pond is filled to capacity (Attachment C of the *Sediment Control Design Report*). Coal processing waste will not be used in construction of the sedimentation pond or embankments.

Chapter 5 of the *Sediment Control Design Report* describes reclamation of the sedimentation pond, topsoil sediment trap, and ASCA. Drawings 4.4.2-3A and 4.4.2-3B show the reclamation layout and cross sections.

The Sedimentation Pond, Topsoil Sediment Trap, and ASCA 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. 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. The drawings are certified by Richard White, PE, but the *Sediment Control Design Report* itself is not certified.

The area under the sedimentation ponds, including the WQVF pond, will not be subsided (Section 4.13.1). No subsidence is anticipated in the area that could impact the groundwater resources in the area of the WQVF (Section 2.3.4.4).

Findings:

R645-301-731.221, -731.222, CS-24 is near the midpoint of the WQVF pad, not down stream of it, and it is upstream of the Topsoil Pile Sediment Trap (Drawings 2.3.6-1 and 3.2.4-3B). The Permittee needs to either move CS-20 farther down stream or add another surface-water monitoring point that is unquestionably downstream of the WQVF.

R645-301-121.200, The double description of the groundwater monitoring well on page 2-35c is confusing, giving the impression that there are two wells, 08-1-5 and a "deep groundwater well" mentioned in the last sentence. The Permittee needs to clarify the language on page 2-35c to indicate there is one groundwater monitoring well.

R645-301-121.200, The amendment states on page 2-35c that spring WQ1-1 monitors near-surface groundwater in the vicinity of the WQFV. On the other hand, Section 2.3.4.4 states that no springs are located in the immediate vicinity of the WQVF. The Permittee needs to clarify where spring WQ1-1 is in relation to the WQFV and what information it will provide on groundwater at the WQVF.

R645-301-725.200, (See previous deficiency under Baseline Cumulative Impact Area Information).

TECHNICAL MEMO

R645-301-731.520, In order for the Division to allow gravity discharges of water from an underground mine, the Permittee must **demonstrate** that the discharge complies with the performance standards of R645-301 and R645-302 and any additional UPDES permit requirements. Because this discharge is likely after reclamation, when no treatment will be possible, the Permittee must demonstrate that untreated water will meet these standards. The Division cannot approve the plan as presented until this information is provided.

R645-3012-731.600, Before the Division can authorize coal mining and reclamation operations within the Stream Buffer Zone, the Permittee must provide a plan to prevent violation of applicable water quality standards and adverse impacts to the water quantity and quality or other environmental resources of Winter Quarters Creek from runoff from the outslope of the Sedimentation Pond and Topsoil Pile berm and the outfall from the Topsoil Sediment Trap and Upper Road ditch and culvert.

R645-301-742.120, ASCAs 37, 38, and 39 are shown on Drawing 3.2.4-3A.

- Discussion for ASCAs 37 and 38 have been added to pages 3-72(b) and 3-72(c), but the Permittee needs to discuss ASCA 39.
- Drawing 3.2.4-3A indicates ASCA 37 covers only a small corner of the Topsoil Storage Pile, but the description on page 3-72(b) indicates the entire pile is included in the ASCA. The Permittee needs to clarify this.
- Sediment control on the outslope of the Sedimentation Pond, either as an ASCA or Exempt Area, must be included in the plan.

R645-301-742.111, -112, 113, The outfalls for the ASCA 39 culvert and Upper Road culvert are shown on Drawing 3.2.4-3A and detailed on Drawing 3.2.4-3E, but the Permittee needs to design a means to convey the water from the outfall to the stream in order to minimize erosion and contributions of sediment to the stream.

R645-301-742.111, -112, 113, The Sedimentation Pond primary and secondary spillways are shown on Drawing 3.2.4-3A and detailed on Drawing 3.2.4-3D, but the Permittee needs to design a means to convey the water from the end of the spillways to the stream in order to minimize erosion and contributions of sediment to the stream.

R645-301-742.112, The Permittee must provide a plan to continue monitoring of the discharge from the mine to Winter Quarters Canyon after reclamation is completed.

R645-301-743.120, The Sedimentation pond 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*. The Permittee must provide the required certification for the sedimentation pond design.

R645-301-743.120, Drawing 3.2.4-3D indicates a 1.45-foot freeboard above the primary spillway elevation; however, the calculations or other design 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.

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

Drawing 2.3.6-1 shows the locations of monitoring sites.

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.

Drawings 3.2.4-3D, Sedimentation Pond Plan; 3.2.4-3E, Road and Drainage Details; 3.2.4-3F, Drainage and Retaining Wall Details; and 3.2.4-3G, Operational Watersheds are certified by Richard White, PE.

Findings:

R645-301-742.224, 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.

TECHNICAL MEMO

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 Monitoring Program is discussed in Section 4.11.2 of the MRP. Throughout the mining and reclamation operations, surface water monitoring will continue according to the monitoring schedule in Sections 2.3.7 and 2.4.4. Postmining data collection will continue at each of the stations until the reclamation effort is determined successful by the regulatory authority. Quarterly samplings will continue to be analyzed according to Table 2.3.7-1 during the postmining period.

The amendment includes a statement on page 4-78(a) that the WQFV sedimentation pond will be removed during early Phase I reclamation and 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. The Coal Mining Rules R645-301-356.300 and -763.100 specify that sedimentation ponds can be removed no sooner than 2 years after the last augmented seeding, which would not allow removal as part of Phase I reclamation. The Permittee needs to clarify that the sedimentation pond will remain until at least 2 years after the last augmented seeding.

The amendment states on page 4-62(a) that gravity discharge from the WQVF is possible at reclamation. To accommodate this discharge, an 8-inch (minimum) stainless steel pipe will extend from inby the seal down to the creek. On the inby side of the pipe, a trash-rack will be fitted onto the pipe to eliminate any clogging of the pipe. The pipe will be buried, daylighting at creek level at a location where the creek is well-armored to accommodate the flow. Figure 4.9-D is a conceptual drawing of this drain, but the amendment contains no design details or sizing calculations for this culvert or for the armoring of the stream.

In Section 4.11.9, the Permittee estimates Winter Quarters Creek could receive 500-600 [gpm?] from the gravity discharge from the reclaimed WQVF, with an estimated TDS concentration in the range of 500-700 mg/L. 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. Based on this limited knowledge of the creek, adding 500 to 600 gpm of sediment-free water to this stream will have the potential to markedly change its character. The Reclamation Plan must address how flooding and streamflow alteration from this significant inflow in Winter Quarters Creek will be mitigated at reclamation.

Findings:

R645-301-750, -752.250, To accommodate the possible 500 to 600 gpm gravity discharge from the WQVF at reclamation, the Permittee is planning for an 8-inch (minimum) stainless steel pipe to extend from inby the slope portal seal down to the creek, with a trash-rack on the inby end. The pipe will be buried, daylighting at creek level at a location where the creek is well-armored to accommodate the flow. Figure 4.9-D is a conceptual drawing of this drain, but the amendment contains no design details or sizing calculations for this culvert or for the armoring of the stream.

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 Monitoring and Sampling Location Maps

Drawing 2.3.6-1 shows the locations of monitoring sites. Postmining data collection will continue quarterly at each of the stations until reclamation is determined successful by the regulatory authority (Section 4.11.2).

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 to the creek are to be considered permanent and left after reclamation. They are shown on Drawing 4.4.2-3A. However, this drawing does not give the location for the stainless steel pipe designed to carry water from the sealed slope portal to Winter Quarters Creek; this pipe location needs to be added to Drawing 4.4.2-3A.

Findings:

TECHNICAL MEMO

R645-301-356.300, -763.100, The amendment includes a statement on page 4-78(a) that the WQFV sedimentation pond will be removed during early Phase I reclamation and 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. The Coal Mining Rules specify that sedimentation ponds can be removed no sooner than 2 years after the last augmented seeding, which would preclude removal as part of Phase I reclamation. The Permittee needs to clarify that the sedimentation pond will remain until at least 2 years after the last augmented seeding.

R645-301-742.313, -742 314, -761, Drawing 4.4.2-3A does not give the location for the stainless steel pipe designed to carry water from the sealed slope portal to Winter Quarters Creek; the Permittee needs to add this pipe location to Drawing 4.4.2-3A.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

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

Analysis:

When the current CHIA was prepared, there was no planned disturbance for Winter Quarters Canyon; therefore, the Division will need to update the CHIA. Additional information is needed to do this. Deficiencies in other sections of this Tech Memo identify the needed information.

Findings:

The Division will update the CHIA when adequate information is available.

RECOMMENDATIONS:

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