

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

July 10, 2006

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor
Joe Helfrich, Environmental Scientist III, Team Lead

FROM: Steve Christensen, Environmental Scientist II

RE: Lease Addition U-024316, U-46484, U-61048 and U-61049, Task No. 2526, CO-OP Mining Company, C/015/0025

SUMMARY:

On July 21st, 2005, COOP Mining Company (the Permittee) submitted an application to extend the Bear Canyon Permit boundary by adding 60 acres to lease U024316, 2,196.09 acres to lease U-61409, 1,400 acres to lease U-46484, 1,108.27 acres to U-61048 and 2,740.00 acres of private property (Mohrland Addition). The application is considered a major revision to the current MRP due to the extensive size of the proposed area additions (approximately 7,504 acres).

The Division of Oil, Gas and Mining (the Division) performed a technical analysis of the submittal and a letter outlining the deficiencies of the application was sent to the Permittee on February 1st, 2006 (Task ID# 2292). On May 21st, 2006, the Division received the Permittee's response to the deficiency letter. The following memo is the second round of hydrologic analysis for the Bear Canyon proposed lease expansion (Task ID# 2526).

Hydrologic information provided in the application does not meet the requirements of the Coal Mining Rules. The proposed amendment should not be approved until the following deficiencies are addressed:

R645-301-724.100, -724.200: State Appropriated Water Rights

- The Permittee needs to insure that all existing water rights for the proposed lease expansion are depicted on Plate 7-12 Water Rights, as well as listed in Table 7-6 Area Water Rights Summary.

R645-301-724, -724.100, -724.200, -731.210 and -731.220: Baseline Data Collection (Environmental Description and Operational Plan)

- The Permittee needs to address the collection of baseline data (both surface and groundwater) in terms of the timing of mining activity (i.e. why some areas are not currently slated for monitoring). Much of the submitted baseline information is outdated. A minimum of 3 years of baseline data will be required for areas that are

currently not being monitored within the proposed lease expansion area. The Permittee should address their plan for obtaining adequate, representative and current baseline information prior to beginning mining activities in areas not currently being monitored.

R645-301-724.310, -728: Probable Hydrologic Consequences Determination

- The Permittee must provide a PHC determination that clearly and directly addresses all the requirements of R645-301-728 for the entire proposed permit area, adjacent areas as well as the private property addition on the east side of the proposed permit area.
- The Permittee should provide a detailed discussion as to the probable hydrologic consequences of undermining the Left and Right Fork of Fish Creek.

R645-301-722, -731: Maps, Plans and Cross Sections (Environmental Description and Operational Plan)

- The Permittee needs to review Plate 7-4 and insure that the depicted monitoring points have the correct color designation as depicted in the map's legend (ex. all water monitoring wells sites are blue and not some other color). Furthermore the Permittee should insure that all points slated for monitoring are not depicted as historically monitored sites or vice versa.
- The Permittee should differentiate between the various coal seams depicted on Plate 7-4. Upon review of the coal seam outlines, it appears that they do not line up correctly and are difficult to decipher.
- The Permittee should remove the water rights symbol in the legend of Plate 7-4, as that information is no longer depicted on that map.
- The Division recommends that different symbols be utilized in order to differentiate between sites that are springs, creeks, monitoring wells etc on Plate 7N-2. In addition, upon review of Plate 7N-2, it appears that not all the sites that were sampled in obtaining baseline information are depicted on the map. They should be included on the map. The legend does not explain what the red dots depicted on the map are.
- The Division also recommends that Plate 7N-2 be modified so that upon review of the map it's readily apparent which sites were utilized in obtaining baseline information. The current configuration of Plate 7N-2 appears to depict both proposed/current water monitoring locations and locations that were utilized solely for the collection of baseline data. A differentiation should be made between the various sampling points.
- The Permittee should clarify on Plate 7N-2 that it was produced by the hydrologic report contained within Appendix 7N. In addition, changing the title of Plate 7N-2 (Water Sampling Locations) might avoid confusion with Plate 7-4 (Water Monitoring).

R645-301-731.210, -731.220: Surface and Groundwater Monitoring

- The Permittee should provide a detailed explanation as to why certain state appropriated water rights are to be monitored while others are not.

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- The Permittee should also provide a commitment to begin monitoring all state appropriated water rights a minimum of three years prior to actively mining any area containing a state appropriated water right.
- The Permittee needs to commit to the sampling of all state appropriated water rights within the Tank Seam mining area. Plate 7-14 as well as Table 7-14 would need to be updated to reflect this commitment.

R645-301-731.210: Groundwater Monitoring

- The Permittee should amend the language on Page 7M-13 of the MRP to allow for three years of water monitoring on Springs FBC-8, FBC-9, FBC-10 and FBC-11 prior to mining the area.
- The Permittee needs to commit to the sampling of all state appropriated water rights within the Tank Seam mining area. Plate 7-14 as well as Table 7-14 would need to be updated to reflect this commitment. Mark agreed to this in the field.
- The Permittee needs to insure that all sites slated for monitoring within the proposed lease expansion area are listed in Table 7-14 of the MRP and on Plate 7-4 (example springs SCC-4, SCC-6 and SCC-7 are to be monitored, yet depicted as historical sites on Plate 7-4 and not listed in Table 7-14).
- The Permittee should address the current status of MW-116 on page 7-55 of the MRP as it is no longer capable of being monitored.
- The Permittee needs to address the status of springs SBC-18 and SBC-12. They are depicted on Plate 7-4 as historically monitored sites, however; they were initially submitted as proposed/active water monitoring sites. It appears that SBC-12 was at one point labeled 16-7-13-1. Spring 16-7-13-1 is depicted in two locations on Plate 7-4. The Permittee should address these discrepancies in the subsequent response.

R645-301-731.220 Surface Water Monitoring

- The Permittee should establish monitoring points for both the Right and Left Fork of Fish Creek in areas above the projected potential subsidence zones and mine workings.
- The Permittee should also establish a plan to monitor both the Left and Right Fork of Fish Creek for subsidence related impacts. The monitoring plan should provide for inspection and data collection of areas potentially impacted by subsidence before, during and after the long wall panel reaches the stream channel.
- The Permittee needs to update the list of streams to be monitored on page 7-57 of the MRP.

R645-301-731.50: State-Appropriated Water Replacement

- The submittal does not adequately address the replacement of state appropriated water supply. The Permittee must provide a description of the measures to be taken to replace adversely affected state-appropriated water supplies or to mitigate or remedy any subsidence-related material damage to the land and protected structures.

R645-301-729: The Permittee needs to address the hydrologic deficiencies listed in this technical memo (Task ID#2526) before the Division can update the Gentry Mountain Cumulative Hydrologic Impact Area with information regarding the addition of the proposed lease expansion.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

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

GENERAL

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

Analysis:

The MRP meets the General Environmental Resource Information requirements as provided in **R645-301-721**. The Division finds that these standards are met because hydrologic resource information for the existing and proposed Bear Canyon permit areas, as well as information for adjacent areas, is presented in Chapter 7, Hydrology, of the MRP. Additional hydrology information is presented in the Probable Hydrologic Consequences of Mining (PHC) determinations for the proposed permit area in Appendix 7-J.

Findings:

The General information provided in the MRP meets the minimum requirements of the Environmental Resource Information regulations.

CLIMATOLOGICAL RESOURCE INFORMATION

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

Analysis:

The application meets the Climatological Resource Information requirements as provided in **R645-301-724**. The Division finds that these standards are met because Section 724.400 of the MRP contains and discusses the relevant climatological information. In addition, Appendix J of the permit provides climatological information for the permit area. Average precipitation was measured by C.W. Mining Company at the Bear Canyon Mine facilities and in Trail Canyon for the period 1993-1997. Annual precipitation data for the years of 1926-1975, obtained from the nearest weather station located in the town of Hiawatha, is provided in Table 7-9 of the MRP.

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Average annual precipitation data was also gathered from the NOAA Station (NCDC 199a) at the town of Hiawatha on the northern extent of the proposed area. The NOAA station consists of three precipitation stations located at the lower elevations of the permit area. Data was provided from the National Resource Conservation Service (NRCS) for two higher elevation precipitation stations west of the permit area. During the period of 1961-1990, the average annual precipitation was 29 inches at the Mammoth-Cottonwood Station (elevation 8,800 feet) and 33 inches at the Red Pine Ridge station (elevation 9,200). These latter stations would be more representative of the precipitation in the higher elevations of the permit area.

A precipitation gauge was installed at the Bear Canyon Mine in mid-1991. Average monthly precipitation values obtained from this gauge are compiled and provided in Table 7-10 of the MRP for the years 1992-1995. Additional precipitation data for the surrounding area is shown in Appendix 7-N. Wind direction and velocity measurements are provided in Appendix 7-P. Temperature data obtained from the Hiawatha weather station from 1922-1975 is provided in Table 7-11. Year values for potential evaporation, transpiration and relative humidity are provided in Section 724.420.

Findings:

The information provided meets the minimum hydrology requirements of the Environmental Resource regulations for Climatological Resource Information.

ALLUVIAL VALLEY FLOORS

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

Analysis:

The application meets the Environmental Resource Information requirements as provided in **R645-301-320 and -724.700**. Alluvial valley floors are not located within the existing or proposed permit areas.

Findings:

The information provided meets the hydrology requirements of the Alluvial Valley Floors regulations.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Sampling and Analysis

The application meets the requirements for Sampling and Analysis as provided in **R645-301-723**. The Division finds that these standards are met because, as stated on page 7-3 of the application, “water quality sampling and analyses have been and will be conducted according to the Standard Methods for the Examination of Water and Waste Water or the methodology in 40 CFR Parts 136 and 434. All samples will be analyzed by certified labs.”

Baseline Information

The application does not meet the hydrology Environmental Description for Baseline Information requirements as provided in **R645-301-724**. Hydrology baseline data is presented in Appendix 7-J, Investigation of Groundwater and Surface-Water Systems in the C.W. Mining Company Federal Coal Leases and Fee Lands, Southern Gentry Mountain, Emery and Carbon Counties, Utah: Probable Hydrologic Consequences of Coal Mining in the Bear Canyon Mine Permit Area and Recommendations for Surface Water and Groundwater Monitoring (Mayo and Associates, 2001 report). The Mayo and Associates 2001 report describes the surface water and groundwater systems of the existing permit area as well as the proposed federal lease additions and the Mohrland area.

However, the Permittee needs to address the collection of baseline data in terms of the timing of mining activity. Much of the submitted baseline information is outdated. A minimum of 3 years of baseline data will be required for areas that are currently not being monitored within the proposed lease expansion area. The Permittee should adequately address their plan for obtaining adequate, representative and current baseline information prior to commencing mining activities in areas not currently being monitored.

State Appropriated Water Rights

The application does not meet the hydrology requirements for Environmental Description of State Appropriated Water Rights as provided in **R645-301-724.100 and -724.200**. The Division finds that these requirements are not met, as Table 7-6 Area Water Rights Summary and Plate 7-12 Water Rights, do not document all the water rights contained within the proposed lease expansion area.

The first technical analysis performed on this submittal identified a deficiency associated with the ownership of water rights listed in Table 7-6. The Permittee has updated the ownership information.

Baseline Cumulative Impact Area Information

The application meets the hydrology requirements for the Environmental Description for Baseline Cumulative Impact Area Information as provided in **R645-301-725**. The Mayo and Associates report generated in June, 2001 “Investigation of Groundwater and Surface-Water Systems in the C.W. Mining Company Federal Coal Leases and Fee Lands, Southern Gentry

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Mountain, Emery and Carbon Counties, Utah: Probable Hydrologic Consequences of Coal Mining in the Bear Canyon Mine Permit Area and Recommendations for Surface Water and Groundwater Monitoring” included in Appendix 7-J of the MRP adequately presents hydrologic and geologic information for the cumulative impact area needed by the Division to provide an assessment of the probable cumulative hydrologic impacts.

Modeling

The application meets the hydrology requirements for the Environmental Description for modeling as provided in R645-301-726. The Division finds that the requirements have been met in that some modeling, interpolation and statistical techniques were utilized in the preparation of this submittal, however; actual surface and ground water information was provided.

Probable Hydrologic Consequences Determination

The application does not meet the hydrology Environmental Description for Probable Hydrologic Consequences. The probable hydrologic consequences determination is provided in Appendix 7-J. It was prepared by Mayo and Associates in 2001, and includes federal coal leases U-46484, U-61048, U-61049, and U-0243 16 and fee lands in the Mohrland area. Figures in the PHC, such as Figures 1, 2, 4, 15, and 18, indicate the PHC did not include approximately 1,320 acres of fee land in Sec. 8, 16, and 21, T. 16 S., R. 8 E.; however, the narrative on page 1 of the PHC states that the “Bear Canyon Mine lease area, the Wild Horse Ridge area, the Mohrland area, and lands immediately adjacent to these areas comprise the area of study for this [PHC] investigation”. It is unclear whether Mayo and Associates’ investigation is adequate for the entire proposed permit area and adjacent areas. No new material has been added to Appendix 7-J for this amendment.

Text in Section R645-301-728 of the MRP has been modified or added. This section generally describes the PHC information in Appendix 7-J. However, this section does not directly address the fee coal and fee lands on the east side of the permit area, the same lands and coal not covered in Appendix 7-J. It is not clear whether the Permittee is asserting the information in Appendix 7-J is sufficient for the fee lands on the east of the proposed permit area, or if the brief discussion in section R645-301-728 is intended to be the PHC for this area. Section R645-301-728, the PHC, needs to contain a clear and direct discussion of the Probable Hydrologic Consequences of coal mining in these eastern fee lands that do not appear to be covered by Appendix 7-J.

The Permittee should provide a detailed discussion as to the probable hydrologic consequences of undermining the Left and Right Fork of Fish Creek.

Groundwater Monitoring Plan

The application does not meet the hydrology Environmental Description for Groundwater Monitoring requirements as provided in **R645-301-724.100**.

Though the Division finds that the proposed groundwater-monitoring plan is based upon the PHC determination contained in Appendix 7-J (Mayo and Associates, 2001 report), the Permittee needs to address the collection of baseline groundwater data in terms of the timing of mining activity. Much of the submitted baseline information is outdated. A minimum of 3 years of baseline data will be required for areas that are currently not being monitored within the proposed lease expansion. The Permittee should address their plan for obtaining adequate, representative and current baseline information prior to commencing mining activities in areas not currently monitored.

Table 7-13 of the MRP contains the Ground Water Quality Parameter's analyzed for baseline monitoring. Figure 1 of the Mayo and Associates 2001 report depicts the locations of the springs, wells and mine inflows that were sampled in obtaining the baseline data. Tabulation of the field parameters, water quality parameters, major ion solute data as well as trace constituent data are presented in Tables A-1 and A-2 of the Mayo and Associates 2001 report.

Surface-Water Monitoring Plan

The application does not meet the hydrology Environmental Description for Surface-Water Monitoring requirements as provided in **R645-301-724.200**.

Though the Division finds that the proposed groundwater-monitoring plan is based upon the PHC determination contained in Appendix 7-J (Mayo and Associates, 2001 report), the Permittee needs to address the collection of baseline groundwater data in terms of the timing of mining activity. Much of the submitted baseline information is outdated. A minimum of 3 years of baseline data will be required for areas that are currently not being monitored within the proposed lease expansion area. The Permittee should address their plan for obtaining adequate, representative and current baseline information prior to commencing mining activities in areas not currently monitored.

Table 7-17 of the MRP contains the Surface Water Quality Parameter's analyzed for baseline monitoring. Figure 1 of the Mayo and Associates 2001 report depicts the locations of the springs, wells and mine inflows that were sampled in obtaining the baseline data. Tabulation of the field parameters, water quality parameters, major ion solute data as well as trace constituent data are presented in Tables A-1 and A-2 of the Mayo and Associates 2001 report.

Findings:

Hydrologic information for the Environmental Resource Information requirements does not meet the minimum requirements of the Coal Mining Rules. Before the application can be approved, the following deficiencies should be addressed:

R645-301-724.100 and -724.200: The Permittee needs to insure that all existing water rights for the proposed lease expansion are depicted on Plate 7-12 Water Rights, as well as listed in Table 7-6 Area Water Rights Summary.

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R645-301-724, -724.100 and -724.200: The Permittee needs to address the collection of baseline data (both surface and groundwater) in terms of the timing of mining activity (i.e. why some areas are not currently slated for monitoring). Much of the submitted baseline information is outdated. A minimum of 3 years of baseline data will be required for areas that are currently not being monitored within the proposed lease expansion area. The Permittee should address their plan for obtaining adequate, representative and current baseline information prior to beginning mining activities in areas not currently being monitored.

R645-301-724.310, -728: The Permittee must provide a PHC determination that clearly and directly addresses all the requirements of R645-301-728 for the entire proposed permit area, adjacent areas as well as the private property addition on the east side of the proposed permit area.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

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

Analysis:

Monitoring and Sampling Location Maps

The application does not meet the hydrology requirements for Maps, Plans and Cross Sections of Resource Information for Monitoring and Sampling Location maps as provided in **R645-301-722 and -731**.

The first technical analysis of the proposed lease expansion identified several deficiencies in terms of the monitoring and sampling location maps. For example Plate 7-4 depicted red dots with no explanation given in the legend as to what they represented or were. It was also not possible to ascertain what types of water resources were to be monitored (i.e. a stream, or a spring or a monitoring well). All the sampling locations were depicted with the same symbol: a red star. The Permittee has corrected these deficiencies by producing a stand-alone water-monitoring map (Plate 7-4). Plate 7-4 breaks out ground water, surface water and monitoring well sampling sites by utilizing different colors for each. In addition, sites that were historically monitored were designated with a unique color as well. Additional information such as baseline data collection points and water rights information have been removed from Plate 7-4 which allows for a much easier review process.

However, it appears that there are more changes to be made to Plate 7-4. The Permittee needs to review Plate 7-4 and insure that the depicted monitoring points have the correct color designation as depicted in the map's legend (ex. all water monitoring wells sites are blue and not some other color). Furthermore the Permittee should insure that all points slated for monitoring are not depicted as historically monitored sites or vice versa. During a recent site visit, C.O.P. representative Mark Reynolds, identified several sites on Plate 7-4 that were depicted as being

historic monitoring sites when they should have been depicted as proposed or active water monitoring sites. Sites SCC-4, SCC-6 and SCC-7 were discussed as such sites that were incorrectly depicted on Plate 7-4 as historically monitored. In addition MW-116 is depicted as a proposed monitoring well site. It is the understanding of the Division that MW-116 is no longer operational and as such, should be depicted as a historically monitored site and not an active or proposed site.

The newest version of Plate 7-4 that the Division received in response to the first technical analysis depicts an outline of the coal seams. The addition of this information to Plate 7-4 is helpful. However, the Permittee should differentiate between the various coal seams depicted on Plate 7-4 and insure that the shapes are accurate. Upon review of the coal seam outlines, it appears that they do not line up correctly. In addition, a water rights symbol is depicted in the map legend. It should be removed, as water rights are no longer depicted on Plate 7-4.

Plate 7-N2, Water Sampling Locations, was identified with several deficiencies during the first round of technical analysis. Upon conversations with C.O.P. representative Mark Reynolds, it was determined that Plate 7-N2 was produced in connection with Appendix 7-N. Appendix 7-N is the Revised Hydrogeologic Evaluation of the Bear Canyon Mine Permit and Proposed Expansion Areas produced by Earthfax Engineering in April of 1993.

Plate 7-N2 still needs to be modified as Plate 7N-2 depicts red dots without being listed in the legend as to what they are. Anything that is depicted on the map needs to be accounted for in the legend of the map. The Division recommends that different symbols be utilized in order to differentiate between sites that are springs, creeks, monitoring wells etc. In addition, upon review of Plate 7N-2, it appears that not all the sites that were sampled in obtaining baseline information are depicted on the map. They should be included on the map.

The Division also recommends that Plate 7N-2 be modified so that upon review of the map it's readily apparent which sites were utilized in obtaining baseline information. The current configuration of Plate 7N-2 appears to depict both proposed/current water monitoring locations and locations that were utilized solely for the collection of baseline data. A differentiation should be made between the two or somehow made clear.

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Subsurface Water Resource Maps

The first technical analysis of the proposed lease expansion had urged the Permittee to produce a separate water rights map, which they have done (Plate 7-12). However, Plate 7-12 is not complete. Upon performing a section by section analysis in the Utah Water Rights Division data-base, it was determined that Plate 7-12 does not depict all of the water rights located within the proposed lease expansion area. The Permittee will need to do a section-by-section review of the water rights in the proposed lease expansion area and depict them on Plate 7-12.

Surface Water Resource Maps

The first technical analysis of the proposed lease expansion had urged the Permittee to produce a separate water rights map, which they have done (Plate 7-12). However, Plate 7-12 is not complete. Upon performing a section by section analysis in the Utah Water Rights Division data-base, it was determined that Plate 7-12 does not depict all of the water rights located within the proposed lease expansion area. The Permittee will need to do a section-by-section review of the water rights in the proposed lease expansion area and depict them on Plate 7-12.

Well Maps

The application meets the hydrology requirements for Maps, Plans and Cross Sections of Resource Information for Well Maps as provided in **R645-301-722.400**. The Division finds that these requirements are met in that the wells in and adjacent to the existing permit area and proposed lease expansion area are monitoring wells installed by the Permittee and are depicted on Plates 7-4, Water Monitoring, and Plate 7N-2, Water Sampling Locations.

Findings:

Hydrologic information for the Maps, Plans and Cross Sections of Resource Information regulations does not meet the minimum requirements of the Coal Mining Rules. Before the application can be approved, the following deficiencies should be addressed:

R645-301-722:

- The Permittee needs to review Plate 7-4 and insure that the depicted monitoring points have the correct color designation as depicted in the map's legend (ex. all water monitoring wells sites are blue and not some other color). In addition, the Permittee should insure that all points slated for monitoring are not depicted as historically monitored sites or vice versa.
- The Permittee should differentiate between the various coal seams depicted on Plate 7-4. Upon review of the coal seam outlines, it appears that they do not line up correctly and are difficult to decipher.
- The Permittee should remove the water rights symbol in the legend of Plate 7-4, as that information is no longer depicted on that map.
- The Division recommends that different symbols be utilized in order to differentiate between sites that are springs, creeks, monitoring wells etc on Plate 7N-2. In

- addition, upon review of Plate 7N-2, it appears that not all the sites that were sampled in obtaining baseline information are depicted on the map. They should be included on the map. The legend does not explain what the red dots depicted on the map are.
- The Division also recommends that Plate 7N-2 be modified so that upon review of the map it's readily apparent which sites were utilized in obtaining baseline information. The current configuration of Plate 7N-2 appears to depict both proposed/current water monitoring locations and locations that were utilized solely for the collection of baseline data. A differentiation should be made between the various sampling points.
 - The Permittee should clarify on Plate 7N-2 that it was produced by the hydrologic report contained within Appendix 7N. In addition, changing the title of Plate 7N-2 (Water Sampling Locations) might avoid confusion with Plate 7-4 (Water Monitoring).

R645-301-724.100, -724.200: The Permittee will need to do a section-by-section review of the water rights in the proposed lease expansion area and insure that all of them are depicted on Plate 7-12.

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 Monitoring

The application does not meet the hydrology Environmental Description for Groundwater Monitoring requirements as provided in **R645-301-731.210**.

Upon review of Plate 7-4, Water Monitoring and Table 7-14, Water Monitoring Matrix: Operational Phase of Mining, it's apparent that many state appropriated water rights are not slated for monitoring. The Permittee should provide a detailed explanation as to why certain state appropriated water rights are to be monitored while others are not.

The Permittee should also provide a commitment to begin monitoring all state appropriated water rights a minimum of three years prior to actively mining any area containing a state appropriated water right.

A deficiency identified in the first technical analysis was a statement on page 7M-13 of the MRP that stated that springs FBC-8 through FBC-11 would be monitored upon the addition

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of Federal Lease U-46484. The Permittee has changed the language on page 7M-13 stating that these springs will not be monitored until “two years prior to mining in this area”. As these springs are U.S.D.A. Forest Service Water Rights, a minimum of 3 years of baseline data will be required in order to establish seasonal variation according to Karl Boyer of the Price, UT USDA Forest Service office. The Permittee should amend the language on Page 7M-13 of the MRP to allow for three years of water monitoring on Springs FBC-8, FBC-9, FBC-10 and FBC-11 prior to mining the area.

Per conversations with C.O.P. representative Mark Reynolds, it was agreed that all water rights within the Tank Seam mining projection area would be monitored. Upon review of the proposed mine workings and corresponding water rights for that area, it’s clear that not all state appropriated water rights are slated for monitoring. The Permittee needs to commit to the sampling of all state appropriated water rights within the Tank Seam mining area. Plate 7-14 as well as Table 7-14 would need to be updated to reflect this commitment.

Per conversations with C.O.P. representative Mark Reynolds, springs SCC-4, SCC-6 and SCC-7 are to be monitored, yet they are not listed in Table 7-14, Water Monitoring Matrix: Operational Phase of Mining, nor are they depicted on Plate 7-4 as proposed monitoring points. These sites are depicted as historically monitored sites. The Permittee needs to insure that all sites slated for monitoring within the proposed lease expansion area are designated as such in Table 7-14 of the MRP and on Plate 7-4 (example springs SCC-4, SCC-6 and SCC-7).

Page 7-55 of the MRP discusses the sampling of MW-116. Due to a subsequent failure of the monitoring well, it can no longer be sampled. The Permittee should address the current status of MW-116 in the language on page 7-55 of the MRP as it no longer capable of being monitored.

The Permittee needs to address the status of springs SBC-18 and SBC-12. They are depicted on Plate 7-4 as historically monitored sites, however; they were initially submitted as proposed/active water monitoring sites. It appears that SBC-12 was at one point labeled 16-7-13-1. Spring 16-7-13-1 is depicted in two locations on Plate 7-4. The Permittee should address these discrepancies in the subsequent response.

Table 7-13 of the MRP contains the Ground Water Quality Parameter’s analyzed for baseline monitoring. Figure 1 of the Mayo and Associates 2001 report depicts the locations of the springs, wells and mine inflows that were sampled in obtaining the baseline data. Tabulation of the field parameters, water quality parameters, major ion solute data as well as trace constituent data are presented in Tables A-1 and A-2 of the Mayo and Associates 2001 report.

Table 7-14, Water Monitoring Matrix: Operational Phase of Mining provides a list of the proposed water monitoring points. Plate 7-4, Water Monitoring, depicts the locations of the existing and proposed sampling points.

The Division will require a site visit for field verification of the various hydrologic features as well as an inspection of proposed sampling points prior to final approval of the submittal.

Surface Water Monitoring

The application does not meet the hydrology Environmental Description for Surface-Water Monitoring requirements as provided in **R645-301-731.220**.

Upon review of Plate 7-4, Water Monitoring and Table 7-14, Water Monitoring Matrix: Operational Phase of Mining, it's apparent that many state appropriated water rights are not slated for monitoring. The Permittee should provide a detailed explanation as to why certain state appropriated water rights are to be monitored while others are not.

The Permittee should also provide a commitment to begin monitoring all state appropriated water rights a minimum of three years prior to actively mining any area containing a state appropriated water right.

Per conversations with C.O.P. representative Mark Reynolds, it was agreed that all water rights within the Tank Seam mining projection area would be monitored. Upon review of the proposed mine workings and corresponding water rights for that area, it's clear that not all state appropriated water rights are slated for monitoring. The Permittee needs to commit to the sampling of all state appropriated water rights within the Tank Seam mining area. Plate 7-14 as well as Table 7-14 would need to be updated to reflect this commitment.

During the course of the first technical analysis, the Division had recommended the Permittee add an additional monitoring point on the Right Fork of Fish Creek as the projected subsidence zone, as depicted on Plate 5-3, depicted a potential impact to this drainage. The Permittee has amended their monitoring program and added a sampling point on the Right Fork of Fish Creek above the confluence with the Left Fork of Fish Creek. The initial submittal for the lease expansion had already established a monitoring point on the Left Fork of Fish Creek above the confluence with the Right Fork. Upon subsequent field visits in the Fish Creek area, it was agreed (per suggestion from Karl Boyer of the USDA Forest Service) that sampling points be established on both the Right Fork and Left Fork of Fish Creek above (or as close to above as possible) the projected mine workings in order to better document and determine what impacts mining activity has on these drainages. The Permittee should establish monitoring points for both the Right and Left Fork of Fish Creek in areas above the potential subsidence zones and mine working. The Permittee should also establish a plan to monitor both the Left and Right Fork of Fish Creek for subsidence related impacts. The monitoring plan should provide for inspection and data collection of areas potentially impacted by subsidence before, during and after the long wall panel reaches the stream channel.

The Permittee needs to update the list of streams to be monitored on page 7-57 of the MRP.

Table 7-17 of the MRP contains the Surface Water Quality Parameter's analyzed for baseline monitoring. Figure 1 of the Mayo and Associates 2001 report depicts the locations of the springs, wells and mine inflows that were sampled in obtaining the baseline data. Tabulation

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of the field parameters, water quality parameters, major ion solute data as well as trace constituent data are presented in Tables A-1 and A-2 of the Mayo and Associates 2001 report.

Table 7-14, Water Monitoring Matrix: Operational Phase of Mining, provides a list of the proposed water monitoring points. The proposed surface water-monitoring plan provides for the quarterly field sampling of two stream locations directly adjacent to the proposed lease addition. Plate 7-4, Water Monitoring, depicts the locations of the existing and proposed sampling points.

The Division will require a site visit for field verification of the various hydrologic features as well as an inspection of proposed sampling points prior to final approval of the submittal.

Diversions: Perennial and Intermittent Streams

No new disturbed surface areas are currently proposed in the lease expansion area.

Replacement of State Appropriated Water Supply

The submittal does not adequately address the replacement of state appropriated water supply as required by **R645-301-525.480** and **R645-301-731.530**. The Permittee must provide a description of the measures to be taken to replace adversely affected state-appropriated water supplies or to mitigate or remedy any subsidence-related material damage to the land and protected structures.

Stream Buffer Zones

No surface disturbance is planned within 100 feet of a perennial stream is proposed in the lease expansion area.

Findings:

Hydrologic information for the Operational Plan regulations does not meet the minimum requirements of the Coal Mining Rules. Before the application can be approved, the following deficiencies should be addressed:

R645-301-731.210, -731.220: Surface and Groundwater Monitoring

- The Permittee should provide a detailed explanation as to why certain state appropriated water rights are to be monitored while others are not.
- The Permittee should also provide a commitment to begin monitoring all state appropriated water rights a minimum of three years prior to actively mining any area containing a state appropriated water right.

- The Permittee needs to commit to the sampling of all state appropriated water rights within the Tank Seam mining area. Plate 7-14 as well as Table 7-14 would need to be updated to reflect this commitment

R645-301-731.210 Groundwater Monitoring

- The Permittee should amend the language on Page 7M-13 of the MRP to allow for three years of water monitoring on Springs FBC-8, FBC-9, FBC-10 and FBC-11 prior to mining the area.
- The Permittee needs to insure that all sites slated for monitoring within the proposed lease expansion area are in Table 7-14 of the MRP and on Plate 7-4 (example springs SCC-4, SCC-6 and SCC-7).
- The Permittee should address the current status of MW-116 on page 7-55 of the MRP as it is no longer capable of being monitored.
- The Permittee needs to address the status of springs SBC-18 and SBC-12. They are depicted on Plate 7-4 as historically monitored sites, however; they were initially submitted as proposed/active water monitoring sites. It appears that SBC-12 was at one point labeled 16-7-13-1. Spring 16-7-13-1 is depicted in two locations on Plate 7-4. The Permittee should address these discrepancies in the subsequent response.

R645-301-731.220 Surface Water Monitoring

- The Permittee should establish monitoring points for both the Right and Left Fork of Fish Creek in areas above the projected potential subsidence zones and mine workings.
- The Permittee should also establish a plan to monitor both the Left and Right Fork of Fish Creek for subsidence related impacts. The monitoring plan should provide for inspection and data collection of areas potentially impacted by subsidence before, during and after the long wall panel reaches the stream channel.
- The Permittee needs to update the list of streams to be monitored on page 7-57 of the MRP.

R645-301-731.50: The submittal does not adequately address the replacement of state appropriated water supply. The Permittee must provide a description of the measures to be taken to replace adversely affected state-appropriated water supplies or to mitigate or remedy any subsidence-related material damage to the land and protected structures.

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

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The application does not meet the hydrology requirements for Maps, Plans and Cross Sections of Mining Operations for Monitoring and Sampling Location maps as provided in **R645-301-731**. Plate 7-4, Water Monitoring and Plate 7N-2, Water Sampling need to be modified from their current form in order to facilitate review of the MRP.

The first technical analysis of the proposed lease expansion identified several deficiencies in terms of the monitoring and sampling location maps. For example Plate 7-4 depicted red dots with no explanation given in the legend as to what they represented or were. It was also not possible to ascertain what types of water resources were to be monitored (i.e. a stream, or a spring or a monitoring well). All the sampling locations were depicted with the same symbol: a red star. The Permittee has corrected these deficiencies by producing a stand-alone water-monitoring map (Plate 7-4). Plate 7-4 breaks out ground water, surface water and monitoring well sampling sites by utilizing different colors for each. In addition, sites that were historically monitored were designated with a unique color as well. Additional information such as baseline data collection points and water rights information have been removed from Plate 7-4 which allows for a much easier review process.

However, it appears that there are more changes to be made to Plate 7-4. The Permittee needs to review Plate 7-4 and insure that the depicted monitoring points have the correct color designation as depicted in the map's legend (ex. all water monitoring wells sites are blue and not some other color). Furthermore the Permittee should insure that all points slated for monitoring are not depicted as historically monitored sites or vice versa. During a recent site visit, C.O.P. representative Mark Reynolds, identified several sites on Plate 7-4 that were depicted as being historic monitoring sites when they should have been depicted as proposed or active water monitoring sites. Sites SCC-4, SCC-6 and SCC-7 were discussed as such sites that were incorrectly depicted on Plate 7-4. In addition MW-116 is depicted as a proposed monitoring well site. It is the understanding of the Division that MW-116 is no longer operational and as such, should be depicted as a historically monitored site and not an active or proposed site.

The newest version of Plate 7-4 that the Division received in response to the first technical analysis depicts an outline of the coal seams. The addition of this information to Plate 7-4 is helpful. However, the Permittee should differentiate between the various coal seams depicted on Plate 7-4 and insure that the shapes are accurate. Upon review of the coal seam outlines, it appears that they do not line up correctly. In addition, a water rights symbol is depicted in the map legend. It should be removed, as water rights are no longer depicted on Plate 7-4.

Plate 7-N2, Water Sampling Locations, was identified with several deficiencies during the first round of technical analysis. Upon conversations with C.O.P. representative Mark Reynolds, it was determined that Plate 7-N2 was produced in connection with Appendix 7-N. Appendix 7-N is the Revised Hydrogeologic Evaluation of the Bear Canyon Mine Permit and Proposed Expansion Areas produced by Earthfax Engineering in April of 1993.

Plate 7-N2 still needs to be modified as Plate 7N-2 depicts red dots without being listed in the legend as to what they are. Anything that is depicted on the map needs to be accounted for in the

legend of the map. The Division recommends that different symbols be utilized in order to differentiate between sites that are springs, creeks, monitoring wells etc. In addition, upon review of Plate 7N-2, it appears that not all the sites that were sampled in obtaining baseline information are depicted on the map. They should be included on the map.

The Division also recommends that Plate 7N-2 be modified so that upon review of the map it's readily apparent which sites were utilized in obtaining baseline information. The current configuration of Plate 7N-2 appears to depict both proposed/current water monitoring locations and locations that were utilized solely for the collection of baseline data. A differentiation should be made between the various sampling points.

Findings:

R645-301-731: The Permittee needs to review Plate 7-4 and insure that the depicted monitoring points have the correct color designation as depicted in the map's legend (ex. all water monitoring wells sites are blue and not some other color). Furthermore the Permittee should insure that all points slated for monitoring are not depicted as historically monitored sites or vice versa.

- The Permittee should differentiate between the various coal seams depicted on Plate 7-4. Upon review of the coal seam outlines, it appears that they do not line up correctly and are difficult to decipher.
- The Permittee should remove the water rights symbol in the legend of Plate 7-4, as that information is no longer depicted on that map.
- The Division recommends that different symbols be utilized in order to differentiate between sites that are springs, creeks, monitoring wells etc on Plate 7N-2. In addition, upon review of Plate 7N-2, it appears that not all the sites that were sampled in obtaining baseline information are depicted on the map. They should be included on the map. The legend does not explain what the red dots depicted on the map are.
- The Division also recommends that Plate 7N-2 be modified so that upon review of the map it's readily apparent which sites were utilized in obtaining baseline information. The current configuration of Plate 7N-2 appears to depict both proposed/current water monitoring locations and locations that were utilized solely for the collection of baseline data. A differentiation should be made between the various sampling locations.
- The Permittee should clarify on Plate 7N-2 that it was produced by the hydrologic report contained within Appendix 7N. In addition, changing the title of Plate 7N-2 (Water Sampling Locations) might avoid confusion with Plate 7-4 (Water Monitoring).

RECLAMATION PLAN

HYDROLOGIC INFORMATION

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Analysis:

Hydrologic Reclamation Plan

The application meets the Reclamation Plan for the Hydrologic Reclamation Plan as provided in **R645-301-731.600**. No update to the existing hydrologic reclamation plan was submitted because no new surface disturbance is planned for the proposed lease expansion area.

Findings:

The information provided meets the minimum hydrology requirements for the Reclamation Plan of the State regulations.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-729.

Analysis:

The application does not meet the requirements of the Cumulative Hydrologic Impact Assessment (CHIA) as provided in **R645-301-729**. The hydrologic information provided in the application is not adequate to update the CHIA. The hydrologic deficiencies listed in this technical memo need to be addressed by the Permittee before the CHIA can be updated.

Findings:

The Cumulative Hydrologic Impact Assessment information does not meet the minimum requirements of the Coal Mining Rules. Before the application can be approved, the following deficiencies should be addressed:

R645-301-729, The Permittee needs to address the hydrologic deficiencies listed in this technical memo (Task ID #2292) before the Division can update the Gentry Mountain Cumulative Hydrologic Impact Area with information regarding the proposed lease additions.

RECOMMENDATIONS:

Hydrologic information provided in the application does not meet the requirements of the Coal Mining Rules. The proposed amendment should not be at this time.