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State of Utah

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DIVISION OF OIL, GAS AND MINING

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OK

October 9, 2002

Mr. Dan Meadors, General Manager
Canyon Fuel Company, LLC
HC 35 Box 380
Helper, Utah 84526

Re: James Canyon Road & Wells, Canyon Fuel Company, LLC., Skyline Mine, C/007/005-AM01K-1, Outgoing File

Dear Mr. Meadors:

The above-referenced amendment has been reviewed. There are deficiencies that must be adequately addressed prior to approval. A copy of our Technical Analysis is enclosed for your information. In order for us to continue to process your application, please respond to these deficiencies by October 23, 2002.

If you have any questions, please call me at (801) 538-5325 or Mike Suflita at (801) 538-5259.

Sincerely,

Daron R. Haddock

Daron Haddock
Permit Supervisor

an
Enclosure
cc: Price Field Office
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Utah!
Where ideas connect

State of Utah

Utah Oil Gas and Mining

Skyline Mine
James Canyon Road & Wells Amendment
C/007/005-AM01K-1
Technical Analysis
October 10, 2002

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TECHNICAL ANALYSIS

The Division administers the Surface Mining Control and Reclamation Act of 1977(SMCRA). When mines submit a Permit Application Package or an amendment to their Mining and Reclamation Plan, the Division reviews the proposal for conformance to the R645-Coal Mining Rules. This Technical Analysis is such a review. Regardless of these analyses, the permittee must comply with the minimum regulatory requirements as established by SMCRA.

Readers of this document must be aware that the regulatory requirements are included by reference. A complete and current copy of these regulations and a copy of the Technical Analysis and Findings Review Guide can be found at http://ogm.utah.gov/coal

This Technical Analysis (TA) is written as part of the permit review process. It documents the Findings that the Division has made to date regarding the application for a permit and is the basis for permitting decisions with regard to the application. The TA is broken down into logical section headings which comprise the necessary components of an application. Each section is analyzed and specific findings are then provided which indicate whether or not the application is in compliance with the requirements.

Often the first technical review of an application finds that the application contains some deficiencies. The deficiencies are discussed in the body of the TA and are identified by a regulatory reference which describes the minimum requirements. In this Technical Analysis we have summarized the deficiencies at the beginning of the document to aid in responding to them. Once all of the deficiencies have been adequately addressed, the TA will be considered final for the permitting action.

It may be that not every topic or regulatory requirement is discussed in this version of the TA. Generally only those sections are analyzed that pertain to a particular permitting action. TA's may have been completed previously and the revised information has not altered the original findings. Those sections that are not discussed in this document are generally considered to be in compliance.

INTRODUCTION

On August 16, 2001 Skyline Mine encountered large groundwater inflows. The inflows were estimated to be about 4,500 gallons per minute (gpm) and required emergency actions to prevent loss of life and equipment. Subsequent pumping and pipelines resulted in expenditures of well over $ 6 million dollars to keep water from filling the mine. Part of the flooding response was to drill two wells in order to pump water to the surface. The wells pump groundwater only and are not pumping water that has been inside the mine. This was intended to relieve water pressure and decrease water inflow to the mine. The wells are located in James Canyon, on the ground surface above the water inflow location. The wells were originally permitted by the Bureau of Land Management (BLM) as an exploration project.

Among other things, this proposed amendment to the Mining and Reclamation Plan (MRP) addresses potential impacts of groundwater inflows to the mine. This includes past inflows in addition to the most recent one on August 16, 2001. The Division received the original James Canyon amendment on November 15, 2001, which was found deficient. The amendment was again submitted to the Division on July 8, 2002. This technical analysis reviews the July 8, 2002 submittal.

It should be noted that the urgency of the situation necessitated two other MRP amendments, which were approved. The first amendment (AM01H) dealt with burial of a pipeline from the James Canyon wells to discharge the well water into Electric Lake. The pipeline is buried adjacent to an old road that runs from the wells down to the lake. The pipeline is to be abandoned at the end of its life and the road has been reclaimed. The second amendment (IB01I-1) dealt with burial of a power line to supply electricity to the wells in James Canyon. The power line is buried adjacent to the same old road as the pipeline; however, it's along the section of road leading from the mountaintop down the road to the wells. This section of road and the power line are still in use.

SUMMARY OF DEFICIENCIES

The Technical analysis of the proposed permit changes cannot be completed at this time. Additional information is requested of the permittee to address deficiencies in the proposal. A summary of deficiencies is provided below. Additional comments and concerns may also be found within the analysis and findings made in this Draft Technical Analysis. Upon finalization of this review, any deficiencies will be evaluated for compliance with the regulatory requirements. Such deficiencies may be conditioned to the requirements of the permit issued by the division, result in denial of the proposed permit changes, or may result in other executive or enforcement action and deemed necessary by the Division at that time to achieve compliance with the Utah Coal Regulatory Program.

Accordingly, the permittee must address those deficiencies as found within this Draft Technical Analysis and provide the following, prior to approval, in accordance with the requirements of:

Regulations

R645-301-230, **1)** Correct the discrepancy between statements made on pages 4-30(b) and 2-120 (j) concerning the amount of topsoil removed from the pipeline disturbance. **2)** The plan reports an average of 6.5 inches salvaged from the 20,000 sq ft drill pad on page 2-120 (f). This should have created a pile containing 400 cu yds, but the plan reports a 100 cu yd of topsoil stored. Correct the statement on page 2-120 (f) to reflect that an average of one inch of topsoil was salvaged from the site. Provide an explanation for the limited amount of topsoil stored for reclamation of the site and develop a reclamation plan to reduce compaction and enhance the drill site pad with organic matter amendments since very little topsoil was salvaged from the site. 51

R645-301-240, The plan must indicate that the top four feet of reclaim surface will not be compacted. 55

R645-301-244, The Plan indicates on page 2-63(b) that reclamation work was completed by September 14, 2001. The seed mix was not developed for the site until October 15, 2001. If the seeding was accomplished by September 14, 2001, please indicate what seed was used in reclamation of the site. If the seed mix described on page 2-63(e) was used, please indicate the correct date of seeding. 57

R645-301-321, Pre-coal mining disturbance diversity and productivity adequate to predict the potential for reestablishing vegetation must be provided. 13

R645-301-322.360, A map showing farm fields in Pleasant Valley that could be affected by the high flows in Mud Creek, including information on ownership, size of the operation, the crop grown, the historical yield of that crop and the value of the crop, relationship of the acreage in Pleasant Valley to the total farm acreage as defined by R645-302-323.400. 17

R645-301-333, The MRP must provide a reference to the report titled A Compilation and Comparison of Eccles Creek Macro-Invertebrate Data for the Period of 1979 – 2002. 49

R645-301-333, The Permittee must continue macroinvetebrate sampling in Eccles and James Canyon until a trend in populations can be established. Permanent sampling stations must be identified. Permanent sampling stations and methodology for current and any future macroinvetebrate sampling must be described in the MRP. 49

R645-301-342.100, Fish and wildlife enhancement measures used during reclamation must be described. 54

R645-301-355, The Permittee must provide a commitment to remove the waterbars at Phase II bond release or at reclamation. 57

R645-301-355, The Permittee must provide a rate of hydromulch application if used as surface mulch during reclamation in James Canyon. 56

R645-301-356, The Permittee must correctly describe the success standard required for bond release. 56

R645-301-728, 724.420, and 724.500, 1) The Operator must expand the scope of the hydrogeologic investigation beyond mining considerations to include regulatory requirements for environmental considerations, especially potential impact to the Hydrologic Balance, **2)** The Operator must provide the Porosity, Specific Yield, and Hydraulic Conductivity of the water bearing formations to justify conclusions regarding their ability or inability to hold and release underground water. This must include formations above and below the coal seams to show the nature of vertical water flow in the area. The application suggests there is better water flow from below than from above the coal seams. Justification for this difference must be provided, **3)** The Operator must provide multiple figures, or a combined figure, showing the changes in potentiometric levels as they occur over time in the mine area. That time should start before any mine water inflows occurred and continue until the most current month for which data is available, **4)** The coinciding of potentiometric surface and Electric Lake level must be shown in the amendment cross-section drawings and discussed in the Probable Hydrologic Consequences, **5)** The Operator must provide a discussion as to whether surface waters might acquire a slightly different ionic composition, as shown on Piper diagrams, as they move from the surface down through the rock layers in a fault, assuming that were taking place. Include the time-dependence of such possible action, **6)** Due to the small number of data points for sample sets, and the lack of any statistical evaluation of the data, several conclusions cannot be regarded as statistically valid. The Operator must provide statistical

validation to support any conclusions for sampling and analyses of Stable Isotope Ratios, Tritium, and Carbon 14. This includes all data submitted in the HCI report, the PHC Addendum, and all other data presented, **7)** The PHC must address changes in Tritium levels and explain possible reasons for those changes, **8)** The Operator must consider the limitation of Tritium to age date waters in that the only differentiation that can be made is whether the waters are younger or older than 1953. Arguments and conclusions drawn must include this limitation, **9)** The Operator must provide Laboratory data sheets for all the water samples analyzed for Tritium and Carbon 14, **10)** The Operator must include Electric Lake in the ground water modeling and in the PHC. Both must include total storage capacity contributing to the groundwater, surface area contacting the ground, hydrostatic head relative to underground water systems, and faults intersecting the lake that could contribute water to underground system, especially those that intersect the lake and the mine, **11)** The Operator must include in their investigation, and in their modeling, the following considerations regarding the underground aquifer described in the HCI report: What is the source of the energy to develop the potentiometric surface? Where did the water in the aquifer originally come from? Where does this aquifer get its new recharge water? **12)** The Operator must address the following in their next submittal. What panels will and will not be mined in Mine 2 before operations cease in that mine? Specifically, will panels 11-Left and 12-Left be mined? What are the plans to install seals and stoppings in Mine 2? What pumping locations would be associated with such plans? Include a map showing locations and planned installation dates of the seals, stoppings, and pumps. What hydrologic changes are expected as a result of the future plans in Mine 2? Specifically, to what elevation will the water level rise in the mine, and what are the anticipated total pumping rates when the water reaches that elevation? Will this water be pumped into Eccles Creek or pumped into Electric Lake? When will all this occur? What are the plans to upgrade the James Canyon pumps? How long will the James Canyon wells continue to operate? At what pumping rates? What actions will be taken to keep Mine 2 in a condition to facilitate future mining? Given the relatively short time of 7 years it will take to mine out the North Lease (Winter Quarters), will mining continue in the Flat Canyon tract? If so, what pumping and other conditions will be needed to mine that tract? What is the estimated time frame for mining Flat Canyon? 44

R645-302-322.421, A description of the characteristics of Mud Creek including roughness, slope and vegetation of the channel, and the physical and chemical properties of the subsoil that will endure sustained high water flows. 17

R645-302-322.431, The geometry and physical character of Pleasant Valley, expressed in terms of the longitudinal profile and slope of the Valley and the channel, the sinuosity of the channel, the cross-section, slopes and proportions of the channels, flood plains and low terraces, the nature and stability of the stream banks and the vegetation established in the channels and along the stream banks and flood plains. 17

R645-302-322.432, The historical nature of surface flows of Mud Creek as shown by the frequency and duration of flows of representative magnitude including low flows and floods. 17

R645-302-324.300, (1) A monitoring plan for stream bank erosion control in Mud Creek and 2) Monitoring of the flows in Mud Creek for quantity and quality and at adequate frequency to determine seasonal trends that could affect farming in Pleasant Valley. 17

R645-302-433, contributions to base flow in Mud Creek from the subsurface. 17

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The James Canyon drill pad and pipeline are located in Section 35, T.13S, R6E (pp 2-63 (a), 2-120 (f) and Soil Resource Evaluation Report of Appendix A2). The powerline is in Sections 25 and 36, T13S, R6E. The pipeline was buried and reclaimed from the drill site in James Canyon to the mouth of the canyon (Electric Lake) and the power cable was buried in the road from the head of the canyon to the drill site (p 2-63(b).

Plate 3.4-1 indicates that the permit and disturbed area boundaries for the length of the James Canyon Road. The permit area is also shown on Drawing No. 1.6-3. Most of the road is within the permit area and a "cherry-stem" has been drawn to include a portion of the road extending outwards from the permit area.

Findings:

Information provided with the submittal is accurate with the exception of a deficiency written under R645-301-230.

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

Soils analyses and field report of the James Canyon area were conducted after disturbance on the topsoil stored and on the berms along the roadways. Mr. Daniel Larsen, Soil Scientist with Environmental Industrial Services of Helper, Utah, conducted a soil survey in September 2001. Inter-Mountain Laboratories of Sheridan, WY analyzed the soil samples.

Findings:

The information meets the requirements of the Regulations.

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:

During construction of Electric Lake, the James Canyon County road was constructed. The road was reclaimed in 1972 and included construction of water bars every one hundred fifty feet (page 2-63b and 2-120i). The road was vegetated with grasses, rabbit brush and sagebrush. According to the soils report in Appendix A2, the route of the buried pipeline in James Canyon is mostly southern exposure from 9,600 feet down to about 8,560 feet elevation.

The site was redisturbed during August of 2001 for construction of the drill site, burial of power cable to the drill site and burial of water pipeline from the drill site to Electric Lake. The power cable originates from the Questar (gas) property at the head of Boardinghouse Canyon and continues along the Monument Peak Road to the head of James Canyon.

Vegetation and soils analysis of the site were conducted after the disturbance to evaluate the condition of the adjacent land and make presumptions about the disturbed area. Both vegetation and soils reports are in Appendix A2.

Findings:

The information provided is adequate for the General Environmental Resources Information section of the Regulations.

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

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

Analysis:

Montgomery Archaeological Consultants conducted a cultural resources survey of the dewatering drill holes and access road on August 21, 2001. The report did not state that the pipeline route was included in the survey although one aspen art site was documented in this

survey adjacent to the pipeline. Chris Hansen, Canyon Fuels, stated on August 24, 2001 that the consultant refers to the pipeline route as the access road.

The James Canyon segment of the county road from Scofield to Fairview was documented as a historic site (42Em2734) along with two aspen art sites (42Em2732 and 42Em2733). The earliest documented date for the James Canyon road was a map dated 1923. The road was decommissioned in 1975 during construction of Electric Lake. The aspen art site adjacent to the road exhibits one carving consisting of "Don Probert 46" and another more recent carving. The three historic sites were recommended as not eligible for the National Register of Historic Places (NRHP) because of lack of artistic elements for the aspen art and lack of retention of structural integrity for the road.

Findings:

Information provided in the application meets the minimum Historic and Archeological Resource Information requirements of the regulations.

VEGETATION RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.19; R645-301-320.

Analysis:

The vegetative communities within the U. P. & L. Tract of the permit area are:

- sagebrush/grass
- riparian
- conifer-timber
- aspen.
- Mountain herbland

An unpaved county road through James Canyon was abandoned in 1972. The abandonment consisted of minor regrading, scarification, installing water bars, and seeding. The current road and well were constructed in late summer of 2001 under a coal exploration permit issued by BLM. The vegetation along the road prior to redisturbance consisted of grasses, rabbitbrush, and sagebrush (page 2-63b).

The application (Vegetation Reference Area in James Canyon) and response to deficiencies letter appear to be stating that this area should be exempt from vegetation standards for plant diversity and productivity standards. The Permittee is required to return the James Canyon area to the pre-mining condition (not pre-disturbed condition). The description provided

of the pre-mining condition is not adequate to predict the potential for reestablishing vegetation and productivity. If the Permittee is not going to provide other data, then the Permittee must commit to the reference area as the pre-mining condition for cover, productivity, diversity, effectiveness, seasonality and other performance standards identified in R645-301-350. The productivity of the reference area must be provided. The deficiency letter states that Rod Player will provide a productivity determination. The Divisions understanding is that Mr. Player is a Wildlife Biologist and may not be qualified to provide productivity estimates. The Division's Vegetation Information Guidelines describe when and how to conduct studies of vegetation including productivity.

Dwg. No. 2.7.1-1a.dwg, UP&L Tract Vegetation Map delineates the vegetative community for the additional permit area.

Findings:

Information provided in the application is not considered adequate to meet the minimum Vegetation Information requirements of the regulations. Prior to approval, the Permittee must provide the following in accordance with:

R645-301-321, Pre-coal mining disturbance diversity and productivity adequate to predict the potential for reestablishing vegetation must be provided.

FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.21; R645-301-322.

Analysis:

Dr. Clayton White conducted a goshawk survey of Burnout Canyon and adjacent areas in May 2001. No goshawks were found, although goshawks and red-tail hawks have been observed in the area in past years (Appendix Volume A-2). There are goshawks nesting in adjacent drainages. (Phone conversation with Rod Player, Forest Service Biologist, on 1/28/02 with Susan White.)

The pipeline will be buried upslope from James Creek. The mouth of James Creek is critical to the Yellowstone cutthroat trout spawning. The Permittee has committed to sampling fish and macroinvertebrates in James Creek (page 2-71 and page 2-72). Sampling reportedly began in October 2000. A commitment should be provided to include the results of these studies in the annual report or as an appendix to the MRP. The permit describes the sampling program as follows:

Multi-pass electrofishing to estimate fish populations will be conducted in October for two consecutive years and then every three years thereafter. The fish surveys will be done in the fall. A macroinvertebrate study of James Creeks will be conducted twice a year for two consecutive years and every three years thereafter. The surveys will be done in the spring and fall.

Findings:

Information provided in the application meets the minimum Fish and Wildlife Resource Information requirements of the regulations.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Analysis:

In a telephone conversation on October 5, 2001, with Gary Taylor, Environmental Coordinator for the Skyline Mine, I verified that for the stretch of Forest Service road outside of the mine's disturbed area boundary and to the well site:

1. There was no topsoil.
2. There was no topsoil salvage.
3. There was no topsoil redistribution.

Consequently, soil survey information provided in Appendix 2 of Chapter 2 is for the half-mile section of reclaimed road in James Canyon where the 16-inch poly pipe has been buried and for the well site. Mr. Dan Larsen, Soil Scientist, with EIS Environmental and Engineering Consultants, Helper, Utah, September 2001, has provided a soil description and field notes for the well site location, and brief notes for the rest of the reclaimed road, supported by hand-dug excavations. Laboratory analysis was conducted on five composite samples collected from soil representing each of the identified soil types and the stockpiled topsoil and subsoil at the well site.

The survey indicates that soils supporting the Aspen/Grass/Forb vegetation type (A) had a topsoil layer that was 16 – 24 inches in depth, very dark brown color and a texture of sandy loam or loam with a granular structure. The subsoil had 15 – 30 percent rock fragments in the fravel and cobble size and was brown to yellowish brown in color, 20 – 40 inches thick. Below this, a dark grayish-brown to brown clay loam soil with blocky structure was encountered. These are Pachic Palecryolls and Pachic Haplocryolls.

Soils supporting sagebrush (S) were found at the lower elevations and were generally loam soils with a brown topsoil horizon of 6 – 12 inches in thickness. The soils were formed from sandstone and shale with deeper subsoils (to forty inches) forming in the colluvial deposits. Generally, these soils are more shallow than the soils that support aspen growth.

An inclusion of calcareous tufa (T) was identified for a 100 feet along the pipeline route, near a spring, approximately ¼ southwest of the drill pad. The Tufa soils had the following characteristics: a 7 – 12 inch dark brown surface layer overlying white subsoil grading to rock at about 20 – 24 inches.

Findings:

The information provided is adequate for the Environmental Soil Resources Information section of the Regulations.

ALLUVIAL VALLEY FLOORS

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

Analysis:

Alluvial valley floor determination

The Division's March 1984 Technical Analysis written for the Valley Camp Mine (ACT/007/001) provides a summation of the history of the alluvial valley floor determination. In 1984, the Division stated that Whisky Canyon and Pleasant Valley above the Utah No. 2 facilities (White Oak Load Out) were observed by the Office of Surface Mining in August of 1983 to be too narrow for flood irrigation or subirrigation agricultural activities. Also in 1984, it was noted that the pastures below the Utah No. 2 Mine (White Oak Loadout) are flood irrigated and the grasses on the valley bottom may be subirrigated. Map R645-301-411.100 Premining Land Use Map shows the land use down stream of the Belina Mine Complex. Shown on this map, are two pastures along Mud Creek in Pleasant valley below the Utah No. 2 Mine (White Oak Load Out).

Skyline Mine discharge waters empty into Eccles Creek and then into Mud Creek. Mud Creek flows through Pleasant Valley, an alluvial valley floor. Section 23, Volume 5 relates the comments of Ray Jensen, Range Specialist for the Bureau of Land Management (BLM). Mr. Jensen describes the area as sub-irrigated, grazed land with an historical yield of 4000-6000 pounds/acre. The predominant vegetation type is grass.

Cost of leasing the land from the BLM ranged from $10 to $20/acre/month. A table in Section 23 Volume 5 shows a total of 219 acres of sub-irrigated, grazed land. The four landowners are shown on Drawing 1.6-1 Surface Ownership.

In the "Response to Technical Analysis Deficiencies" accompanying this submittal (page 4), the Permittee indicates that Observation of the grazed property in July revealed 20 cattle and 4 horses on the 78 acre Rodakovich parcel; 65 cattle and 2 horses on the 45 acre Jensen parcel; and 25 cattle on the 75 acre Utahna Pace Jones parcel. Inquiries were not made directly of the surface owners.

The Permittee indicates that should grazing be impeded due to high flows along Mud Creek, the BLM has other grazing available for lease in the vicinity of Pleasant Valley.

No permit or permit change application for coal mining and reclamation operations in Utah will be approved (R645-302-323.100) unless the Division finds in writing, on the basis of the information set forth in the application that (R645-302-232.120) the proposed operations would not materially damage the quantity and quality of water in surface and underground water systems that supply those alluvial valley floors which are outside the permit area of an existing or proposed coal mining and reclamation operation (R645-302-323.122). The significance of the impact to farming will be based upon loss of production and income (R645-302-323.200). Material damage to the quality of waters will be determined by concentration of total dissolved solids (R645-302-323.310) and reduction in the area available to agriculture as a result of flooding or increased saturation of the root zone (R645-302-323.324).

Coal mining may interrupt farming on an alluvial valley floor where the acreage impacted is so small as to be negligible to the farm's total agricultural production (R645-302-324.222)

The Permittee has deferred response to the deficiencies written in April 2002, until completion of the EarthFax report. The Information from the EarthFax report must be included in the submittal for review by the Division. The deficiencies to be addressed by the EarthFax report are reprinted below, exactly as before on April 3, 2002.

Findings:

In accordance with R645-302-321.300, the Division finds that Eccles Creek does not lie within the Alluvial Valley Floor, but that Mud Creek does. Furthermore, the Division finds as per R645-302-322.100 that the sustained high flows in Mud Creek most probably affects the alluvial valley floor downstream of the White Oak Loadout.

Consequently this application must provide the information required under R645-301-322, Application Contents for Operations Affecting Designated Alluvial Valley Floors, such that

the Division will be able to make the findings required by R645-302-323.122, a determination that the Skyline mining operation will not interrupt, discontinue or preclude farming in Pleasant Valley downstream of the mining activity and outside of the permit area or that the impact is negligible to a farm's total agricultural production (R645-302-324.222).

Therefore, the Division requests the following in accordance with:

R645-301-322.360, A map showing farm fields in Pleasant Valley that could be affected by the high flows in Mud Creek, including information on ownership, size of the operation, the crop grown, the historical yield of that crop and the value of the crop, relationship of the acreage in Pleasant Valley to the total farm acreage as defined by R645-302-323.400.

R645-302-322.421, A description of the characteristics of Mud Creek including roughness, slope and vegetation of the channel, and the physical and chemical properties of the subsoil that will endure sustained high water flows.

R645-302-322.431, The geometry and physical character of Pleasant Valley, expressed in terms of the longitudinal profile and slope of the Valley and the channel, the sinuosity of the channel, the cross-section, slopes and proportions of the channels, flood plains and low terraces, the nature and stability of the stream banks and the vegetation established in the channels and along the stream banks and flood plains.

R645-302-322.432, The historical nature of surface flows of Mud Creek as shown by the frequency and duration of flows of representative magnitude including low flows and floods.

R645-302-433, contributions to base flow in Mud Creek from the subsurface.

R645-302-324.300, (1) A monitoring plan for stream bank erosion control in Mud Creek and 2) Monitoring of the flows in Mud Creek for quantity and quality and at adequate frequency to determine seasonal trends that could affect farming in Pleasant Valley.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Probable Hydrologic Consequences Determination

Division Analysis of Skyline Mine Inflows as of October 2002

NOTE: From this point in this document until the heading **Division Analysis of This Amendment** has all been researched, developed, and interpreted by the Division.

Flooding at Skyline Mine is unique compared to other groundwater inflows at Utah mines. Therefore, the Division took the initiative to begin investigating the situation before this amendment was received. The investigation used information provided in meetings with the Operator, several government sources of hydrologic information, as well as information provided in this proposed amendment. Ground water and surface water were both considered. The intent was to look at the order of magnitude of the situation with reference to the Probable Hydrologic Consequences. Further, the Division is responsible to provide a Cumulative Hydrologic Impact Assessment (CHIA). Anticipating the situation might affect the CHIA, the Division felt justified in pursuing such investigation.

Volume of Groundwater Extracted. The proposed amendment indicates the volume of Electric Lake is 31,500 acre-feet. This figure agrees with data previously obtained from Utah Power & Light. There is water in the lake that cannot be removed, and this volume is termed "dead storage". When the dead storage is factored in, U P & L considers the "active storage" of the lake to be 30, 000 acre-feet. While this will vary with annual precipitation, this is the volume typically available for water users below the lake, every year.

Immediately after August 16, 2001, total pumping from the mine was about 8,700 gpm. Presently that has stabilized at about 11,000 gpm. This includes 9,000 gpm into Eccles Creek and 2,000 gpm into Electric Lake. When this total is converted to acre-feet per year the result is 17,744 ac-ft/ yr. **At this pumping rate, the mine is withdrawing enough groundwater to fill 59% of Electric Lake every year**. (17,744/30,000 = 0.59) Since the inflows and pumping may continue for many years, possibly decades over the life of the mine, a great deal of water is involved. Regulations require a determination of possible impacts there may be to the Hydrologic Balance in the area. For reference, a preliminary estimate of the surface area from which groundwater is being pumped is 4 miles by 5 miles or 20 square miles.

Comparison to Other Mines. Underground mines do NOT want to intercept water. To do so interrupts mining operations and costs time and money to remove the water. Mines do all they can to predict and avoid groundwater. Also, water inflow rates change considerably with time as the mining proceeds into different underground areas. The large inflows to this mine were certainly a surprise and it's believed they could not have been predicted. It was considered

appropriate to put into perspective the Skyline Mine inflows as compared to other mines. Typically, underground mines in Utah produce on the order of hundreds of gallons per minute. The following table illustrates the pumping rates of some of the larger water-producing mines in Utah. While they vary with time, these are ongoing or average rates. These rates are compared to the 9,000 gpm currently pumped by Skyline Mine. The point is to demonstrate the water inflows to Skyline Mine are considerably higher than those experienced at any other Utah mine and are probably a record for such inflows.

Mine Name	Approximate Pumping Rate	Skyline Pumping (9,000gpm) is This Many Times Greater
SUFCO	2,430 gpm	4X
Deer Creek	1,500 gpm	6X
Emery Deep	418 gpm	22X
Hiawatha	300 gpm	30X
Cottonwood	250 gpm	36X
Bear Canyon	40 gpm	225X

Streamflow. Eccles Creek is a tributary of Mud Creek. The natural flows in both streams were determined and compared to flows being pumped from Skyline Mine into both streams. U.S. Geological Survey (USGS) records are available for Mud Creek from 1991 to 2000. The mean flow volume of Mud Creek, just below Winter Quarters Canyon, Scofield, UT is 9,120 acre-feet per year. The recording station is located about 1 ½ miles upstream from where Mud Creek enters Scofield Reservoir. The years of record are generally in a wet to very wet weather regime as shown by the Palmer Hydrologic Index for the same 1991 to 2000 time period. Therefore, that flow was reduced 5% to more accurately reflect average conditions. For the purposes of this analysis, Mud Creek flows of 8,664 acre-feet per year are used. (0.95 X 9,120 = 8,664)

The only U.S. Geological Survey records available for Eccles Creek were for the years 1980 to 1984. These records were not used since they are not the same time period, are half the length of Mud Creek records, and occur during the most prolonged and most wet period of time since records were begun in 1895. Thus, they are not representative of typical flows and it would not be appropriate to compare these records to those for Mud Creek. Since Eccles Creek is a tributary to Mud Creek, and their watershed drainage characteristics are similar, their drainages areas were compared. USGS records indicate the Mud Creek drainage above the recording station is 29.1 square miles. Using topographic maps it was determined that the Eccles Creek drainage is about 5.3 square miles or 18% (5.3/29.1= 0.18) of the drainage area of Mud

Creek. Thus, the streamflow in Eccles Creek would be about 1,587 acre-feet per year. (0.18 X 8,664 = 1,587)

Converting acre-feet per year to gallons per minute shows the mean or average flows to be: Mud Creek 5,371 gpm and Eccles Creek 984 gpm. These flows can be visualized as the constant flow all year long if the naturally varying flows were evened out over the whole year. These flows are compared to the 9,000 gpm pumped from Skyline Mine. Since the pumped quantities are in addition to natural flows, the two are added together.

Stream	Mean Natural Flow	Mean Natural Flow + Mine Pumping	Times Greater Than Natural Flow
Eccles Creek	984 gpm	9,984 gpm	10 X
Mud Creek	5,371 gpm	14,371 gpm	3 X

With the flow in Eccles Creek 10 times the natural flow, stream erosion rates will be much greater than natural rates. While the stream is naturally armored and withstands spring flood flows larger than the combination of mean natural flows and mine pumping, those flows only last about 30- 40 days. The pumped flows continue every day of the year and are added to both high spring runoff and low summer flows. For reference, Eccles Creek slopes about 5% below the mine, and it's about 2.5 miles from the mine to the mouth of Eccles Creek at Mud Creek.

Similarly, with the flow in Mud Creek 3 times the natural flow, stream erosion rates would be greater than natural rates. This stream is not armored and flows through farmlands having silt soils. The stream meanders a great deal and is quite susceptible to erosion. Importantly, as indicated in the other sections of this Technical Analysis, the Mud Creek valley below the White Oak mine loadout has been determined to be an Alluvial Valley Floor. The Office of Surface Mining made this determination in 1984. Further, this valley is also determined to be Prime Farmland. While the stream withstands spring flood flows larger than the combination of mean natural flows and mine pumping, those flows only last about 30- 40 days. The pumped flows continue every day of the year and are added to both high spring runoff and low summer flows. For reference, Mud Creek slopes about 1% below Eccles Creek, and it's about 2.9 miles from the mouth of Eccles Creek to the gauging station below Winter Quarters Creek.

The mine Operator is responsible to quantify and prevent potential damage to streams outside the Permit area. The mine-pumped waters should be controlled to prevent such damage. One possible method of preventing potential stream damage would be to place the pumped water in a pipeline. The Operator used a buried pipeline in James Canyon to prevent damage to that stream. Similarly, the amendment indicates, "Several tens of miles of 12 to 22-inch HDPE pipe

were laid within the mine to pump water to other active and inactive workings as well as to the surface and Eccles Creek." All this suggests a pipeline be used to carry the pumped water from the mine to Electric Lake. This appears appropriate since the mine inflows are located 0.8 mile, or more, west of the mountain ridge that forms the surface hydrologic divide between Carbon and Emery Counties. Such a pipeline would be only 2.25 miles long and could connect to the recently abandoned gas pipeline leading to Electric Lake. Just as pipelines are used to protect the mine and it's resources, such a pipeline would protect Eccles Creek and Mud Creek. Piping the mine-pumped water would allow only natural flows in the streams.

Electric Lake. A lengthy and in-depth analysis was made by the Division to try to establish whether the mine inflow waters were coming from Electric Lake. The point at which water entered the mine on August 16, 2001 is about 2,300 feet east of the east shoreline of Electric Lake. Such a large water body close to the mine naturally led to such an investigation.

Since the major inflow of 4,500 gpm began on 8/16/01, the time of study was 6/7/2001 to 9/6/2001. Water surface elevation was compared to lake discharge flows over that time period. The mine discharge was then plotted on the same graph as the above parameters. A cross section from the lake to the wells in James Canyon was drawn to illustrate the physical aspects of the situation. Water surface elevation and lake discharge data was derived from spreadsheets provided by Utah Power & Light. Although considerable time and effort were expended, the conclusion of the study was, " The overall conclusion of this analysis, both review of curves and slope analysis, appears to be that there's no definitive evidence one way or the other. That is, there's no evidence to suggest or conclude that Skyline Mine flooding IS or IS NOT affecting the rate at which the water surface of Electric Lake declines. As of 9/10/01." This analysis was shared with all stakeholders including the mine Operator, U P & L, water users, and the Forest Service.

Since the analysis results were inconclusive, a method was developed to continue the study. This involved comparing total water volumes in and out of the lake to the total water volume decrease in the lake over the same time period. This would be a kind of " account balance" of water for the lake. It would involve all stream inflows, rainfall, lake discharge, and evaporation. If the account did not balance, this would show a volume of water was unaccounted for and this could be compared to the water volume that came into the mine. The Division suggested and encouraged Utah Power and Light and the mine Operator continue with the "account balance" analysis. This analysis was begun in June 2002 and the results to date are included in this Technical Analysis.

Summary of Division Investigations. The Division analysis of the above categories indicates, 1) Significant quantities of groundwater are being withdrawn and impacts inside and outside the permit area are unknown, 2) The pumping flows from the mine set a record for Utah coal mines, 3) Mine-pumped water flows in Eccles Creek and Mud Creek pose a risk of damage to those streams, and 4) Whether mine inflows are derived from Electric Lake has not been

proved or disproved. All of these suggest the situation has the potential to cause harm to the Hydrologic Balance within, and adjacent to, the permit area.

Division Analysis of This Amendment

NOTE: The remainder of this document presents the material submitted in the proposed amendment, accompanied by Division comments and interpretation of that material. Quotation marks indicate the statement is taken directly from that section of the text being discussed.

Progress Report No. 2

In the amendment, Appendix C, HCI PROGRESS REPORT NO. 2, contains an in-depth review of the geologic, hydrologic, and mining conditions encountered at Skyline Mine. The report is titled, UPDATED CONCEPTUAL HYDROGEOLOGY, EVALUATION OF CURRENT AND FUTURE DEWATERING, AND PROPOSED TESTING PROGRAM FOR SKYLINE MINE. It's dated February 2002. Included in the report are two area maps, Plates I and II with three associated cross-sections, Plates III, IV, and V. Together, these provide a graphical representation to accompany the explanatory text.

Section 1, INTRODUCTION, of the report gives the historical background of the events leading to the investigation and work done previously. Also included are the aims of the study:

1) "Assess whether the inflow to the 10-Left entries can be stopped in a cost-effective manner."
2) "Define the hydrogeologic conditions in the Flat Canyon tract; evaluate the potential need for dewatering that area, and design, if deemed necessary, a dewatering system to be installed as timely and cost-effectively as possible."
3) "Evaluate, on a preliminary level, whether the Winter Quarters area would constitute a better mining option in terms of hydrologic risk."

Division Comment: This report is the most comprehensive and meaningful of the investigations done to date. It should be noted that the aims are all mining-related and do not contain any environmental considerations or attempts to determine Hydrologic Consequences. Given the immediate needs of the mine, this would be appropriate. The Division requires that the Operator expand the scope of the hydrogeologic investigation to include regulatory requirements for environmental considerations, especially potential impact to the Hydrologic Balance. See R645-301-728.

Section 2, SUMMARY OF HYDROGEOLOGIC INVESTIGATION TO DATE, of the report lists "a point summary of the tasks completed to date as part of HCI's hydrogeologic investigation of the Skyline Mine area."

Section 3, UPDATED CONCEPTUAL HYDROGEOLOGIC MODEL, of the report contains several sub-sections that will be discussed separately below. The introductory paragraph describes development of a "conceptual model" and a "predictive numerical ground-water flow model".

Section 3.1, HYDROSTRATIGRAPHY, of the report examines the geologic formations above and below the coal seams. Figure 1, Isopach of Storrs Sandstone and Figure 2, Isopach of Panther Sandstone show the variation in thickness of those two formations, fault locations, and mine inflow locations. The report indicates that these figures show, "no obvious correlation between inflow and the thickness of either sandstone". Further, the report comments, " It is important to note that the storage capacity of the Storrs, Panther, and Trail Canyon Sandstones beneath the Skyline Mine is insufficient to account for the sustained ground-water inflows experienced in the mine." Continuing on, the report describes the log of a nearby gas exploration drillhole.

Division Comment: The exploration drillhole is located in the northwest portion of the permit area, due west of the disturbed (mine facilities area in Eccles Canyon and near the west permit boundary. The hole is about 6,000 feet north-northwest of the inflow at 16-Left, which is the northern-most inflow to the mine. The drill log showed 14 seams of sandstone of varying thickness from 24 to 115 feet thick. The total thickness was 743 feet of such sandstone formations. All of these are BELOW the mine elevation.

The report concludes this section with, "This (stacked sequence of sandstones beneath the Panther and Storrs Sandstones) is a most significant finding. If present beneath the Skyline Mine, these sandstones could explain the sustainability of the five existing major inflows into the mine – the missing source – as well as pose risk to future mining".

Division Comment: Unstated, but understood from the maps and cross-sections in the report, is the sandstones in the region are all faulted. These faults likely provide large surfaces for the water in the formations to come out of the rocks as well as provide conduits for water flow.

Division Comment: In order to understand the capacity of the sandstone formations to act as underground reservoirs, it's necessary to know how they hold, release, and conduct water. Therefore, the Porosity, Specific Yield, and Hydraulic Conductivity must be known. None of these parameters, or a discussion on their impacts was provided. The Operator must provide such information to justify conclusions regarding the ability or inability of the formations to hold and release underground water. This must include formations above and below the coal seams to

show the nature of vertical water flow in the area. The text suggests there is better water flow from below than from above the coal seams. It needs to be clarified whether this is an accurate interpretation.

Section 3.2, MAJOR FAULTS, of the report describe, "Major north-south trending, regional-scale faults cut through the Skyline Mine area. The two most significant are the Pleasant Valley Fault Zone along Mud Creek to the east of the mine, and the Gooseberry Fault Zone, a segment of the Joes Valley Fault, in Gooseberry Creek to the west. The two faults juxtapose lower-permeability rocks of the Blackhawk Formation (on the east) and the North Horn Formation (on the west) against the Starpoint sandstones in the block beneath the mine area." Also, "The Connelville Fault, with about 200 ft of vertical displacement, defines the southeast boundary of the mine." Further, "A number of lesser faults and fracture zones occur between the Pleasant Valley and Gooseberry Creek Faults, many of which have been encountered in the mine workings." Plate I, Base Map of Hydrogeologic Investigation of Skyline Mines, and Plate IV, Conceptual Hydrogeologic Base Map show the major and minor faults described in the text.

Division Comment: The report, including the maps, appears to indicate that the three major faults, Gooseberry, Pleasant Valley, and Connelville, form regional boundaries to the groundwater regime in the Skyline Mine area. Regionally, the faulting has resulted in low permeability rocks being displaced vertically next to the permeable and water-bearing sandstones. The area within the major faults has several interconnected fractured zones, which are likely to make groundwater transfer relatively easy within the boundaries formed by the three major faults.

Division Comment: Although not stated in the report, it's believed that the mine area is in extension or upward bulging, due to intrusion from below. This is suggested by the large number of dikes throughout the mine area, especially in the center of Mine 2. This extension tends to push the faults apart thus increase their ability to carry water flows. This is based on communications with the mine Operator, and Alan Mayo, a Hydrogeologist who has investigated the area.

The report points out that "All of the significant ground-water inflows in the Skyline Mine to date have been associated with north- and northeast-trending faults in the Level 2 area. The east-west trending faults in the Level 3 area (north of Level 2) area apparently have not produced large nor persistent inflows". Further, the report indicates, "Ground-water inflows to other coal mines in the Wasatch Plateau and Book Cliffs have been characterized as highly compartmentalized. Although there is definitely strong structural control of ground-water in the Skyline Mine area, measured changes in water levels over relatively large areas suggest the ground-water system might not be as compartmentalized as at other mines in the Wasatch Plateau."

Section 3.3, GROUND-WATER LEVELS, of the report includes Figure 4, Water Levels in Flat Canyon Monitoring Wells. This figure is a plot of water surface elevation in 8 wells plotted over time from 11/11/98 to about 01/15/02. Dates and locations of four of the mine water inflows are shown. After discussing the data, the report indicates, "These interpreted water levels and drawdowns suggest:"

1. "Drawdown from the major inflows to the mine has propagated primarily along the larger, mapped fault zones. However, there is a broad area in the northeast corner of the Flat Canyon Tract, centered on the three earliest inflows, where water levels have drawn down an estimated 200 to 300 ft since the original water "hits" in 1999."

Division Comment: Figure 4 shows clear downward trends in well water elevation in the monitoring wells after most of the mine inflows. Keep in mind that these drawdowns are in the potentiometric surface above the coal seams. Using the figures in No 1 above, the Division calculated the overall rate of water elevation drop to be at least 0.31 ft/day. This is a large overall decline in potentiometric surface and it happened at a fast rate. This clearly indicates large amounts of groundwater have an easy time moving quite rapidly.

Division Comment: The following definition is provided for those unfamiliar with the term potentiometric surface. "A surface that represents the level to which water will rise in tightly cased wells. If the head (water level) varies significantly with depth in the aquifer, then there may be more than one potentiometric surface. The water table is a particular potentiometric surface for an unconfined aquifer". Source: Applied Hydrogeology, by C.W. Fetter, Third Edition, 1994. Multiple wells are needed to define this surface over large areas. The mine employs many such monitoring wells and the potentiometric surface is defined over the mine area.

Division Comment: Figure 6, Potentiometric Levels as of October 2001 graphically shows ground-water drawdown at one point in time, as it had occurred over the mine area, up to October 2001. The ability to view the potentiometric surface is a great aid in gaining insight and arriving at conclusions. After discussing it with the mine Operator, it was decided that further and improved insight could be gained by looking at that surface as it changed over time. That is, create multiple figures depicting the potentiometric surface on successive months. As the surface changes shape with time, it's expected that there would be indications of the source of the water. For example, if the water were coming from Electric Lake, the lines of equal potentiometric level might change shape over time and "point" toward the lake. Conversely, it might be that no such indicators show up. Therefore, the Division requires that the Operator provide multiple figures, or a combined figure, showing the changes in potentiometric levels as they occur over time. That time should start before any mine water inflows occurred and continue until the most current month for which data is available. As discussed, the data is already available, although considerable processing is necessary to present it in this manner.

Division Comment: In Figure 6, Potentiometric Levels as of October 2001, there are 4 lines indicating contours of equal potentiometric level. Taken together, the contours bend or "point" when they encounter 3 of the faults in the area. Two of these faults do not intersect Electric Lake while one of the faults does intersect the lake. In addition, the fault that intersects the lake is the same fault where the mine encountered water at 10-Left. Keep in mind, the potentiometric surface is a representation of the energy or "head" of water available, and may or may not, be indicative of the actual physical water surface underground. The contours clearly indicates the mine is drawing down that potentiometric head.

Division Comment: The outline of Electric Lake was added to Figure 6, Potentiometric levels as of October 2001. In Figure 6, the outer-most line of equal potential is at an elevation of 8,500 feet and it crosses over Electric Lake about the center of the lake. The Division researched Pacificorp records and found the average level of Electric Lake during October was 8,521 feet. **The underground water potentiometric surface and lake level are almost identical during the month of October 2001. Their physical locations also coincide.** This is a striking comparison. However, it does not actually establish any cause and effect relationship. This coinciding of potentiometric surface and lake level must be shown in the amendment cross-section drawings and discussed in the Probable Hydrologic Consequences.

Section 3.3, GROUND-WATER LEVELS, of the report continues:

2. "The inflow at 10-Left and pumping from JC-1 alone has resulted in more than 100 ft of additional Drawdown locally since August 8 and between 10 and 35 ft of additional Drawdown across the Flat Canyon Tract."

Division Comment: Wells in the Flat Canyon Tract are nearly two miles from the mine inflows and covers about 6 square miles. Similar to conclusion 1 above, this indicates that large amounts of groundwater have an easy time moving great distances in a short time, and over a large area.

3. "There are no apparent vertical gradients between the Storrs Sandstone, Panther Sandstone, and the LOB seam."

4. "All of the mapped faults in the Level 2 and Flat Canyon areas are hydraulically connected and have propagated drawdown into areas where faults have not yet been mapped."

Section 3.4 WATER CHEMISTRY of the report, contains four arguments, using different water chemistry parameters, to conclude, "the water chemistry data clearly indicate that the ground water flowing into the mine (specifically at 10-Left) and the water being pumped from dewatering wells JC-1 and JC-2 are significantly different from Electric Lake water. This precludes the existence of a direct "conduit" between Electric Lake and the 10-Left inflow and JC wells."

Division Comment: The following Division analysis of these arguments suggests that conclusion may not be quite as strong as proposed.

Ionic Composition

Division Comment: The first analysis takes a group of water samples from the mine & James Canyon wells and a group of water samples taken from Electric Lake. The samples are examined for their ionic composition and then they're plotted on a trilinear (Piper) diagram, which is shown as Figure 8, Trilinear Plot of Water Chemistry: Mine Inflows, Dewatering Wells, and Electric Lake. All three portions of the diagram show the same general groupings. The Electric Lake waters all plot in a tight cluster and the mine inflow and well waters plot as another cluster. The report indicates, "surface water samples from Electric Lake have an ionic composition quite distinct from the water samples collected from the underground."

Division Comment: Three of the underground samples, B, F, and G, are taken from the same fault and very near the same location. These might be considered essentially the same sample. Also, the group of surface water samples is very close to the group of ground water samples on all three sections of the Piper diagram. It's possible the surface waters acquired a slightly different chemistry as they moved from the surface down through the rock layers in a fault, assuming that were taking place. Such solution of chemicals is time-dependent and the Division is not aware of how long that would take. There needs to be more discussion as to whether the above issues have been considered in reaching the conclusion that the waters are distinct groups based on ionic composition.

Stable Isotope Ratios

After a brief description of the isotope data, and the plot of Figure 9, δ^2H and $\delta^{18}O$ for Mine Inflows, Dewatering Wells, and Electric Lake, the report concludes, "the waters are different."

Division Comment: This analysis takes three samples from Electric Lake and four samples from the underground and analyzes them for stable isotope ratios. Due to the small number of data points for each sample set, and the lack of any statistic evaluation of the data, the conclusion cannot be regarded as being statistically valid. While the data does suggest that the waters are different, the Operator must provide a statistical validation to support any conclusions.

Tritium

In addition to the data listed in Table 1, the report has only three sentences devoted to the subject of Tritium. The last sentence indicates, "These data strongly indicate that the underground inflow at 10-Left and the discharge from JC-1 do not have a significant hydraulic connection with Electric Lake."

Division Comment: The analysis for Tritium uses water samples from Electric Lake and underground. There are four samples from underground water and three samples from Electric Lake. See Table 1, Water Chemistry Data. Due to the small number of data points for each sample set, and the lack of any statistic evaluation of the data, the conclusion cannot be regarded as statistically valid. The Operator must provide a statistical validation to support any conclusions.

Division Comment: The amendment contains more Tritium data in the PHC Addendum, Appendix A. While the number of data points for each sample set is larger, there is no discussion of how the data is be interpreted and no statistic evaluation of the data. No conclusions are given regarding Tritium. The Operator must provide an evaluation and interpretation of the Tritium data accompanied by statistical validation to interpret the Tritium data found in the HCI report, the PHC Addendum, and all other data presented.

Division Comment: PHC Addendum, Appendix A, lists twenty-two samples of underground water taken at various locations where water entered the mine. Importantly, all samples in this set were taken from faults, and most are from faults that are a part of the current water inflow situation. The average Tritium Units (TU) was 0.15 and varied from –0.01 to 0.88.

Division Comment: Additional data provided by the Operator shows water from well JC-1 was sampled for Tritium. This well takes water from the fault believed to contribute to the largest mine water inflow at 10-Left. One initial sample on 09/26/01 shows 0.17 Tritium units. Unfortunately this was the only sample taken at this time, so statistical validity is questionable. The next Tritium sample at JC-1 was taken 8 months later. Essentially, pairs of samples were taken in May, June, July, and one sample in August of 2002. These later samples ranged from 0.96 to 1.18, with an average of 1.05. No ^{14}C analysis was done on these samples and no ages are given for these later samples. The change from 0.17 to 1.05 is almost an order of magnitude increase over a 10-month period. This suggests that the water being pumped at JC-1 is becoming younger as pumping continues over time. This could be attributed to younger water mixing with older water. Possibly the source of the younger water could be Electric Lake. The change in Tritium could also be attributed to the water in the region being drawn down, and younger water is beginning to appear at the well.

Division Comment: Table 1 of the HCI report indicates Electric Lake had one shallow water sample taken with 13.0 TU and two deep-water samples taken with values of 11.7 and 12.3, for an average of 12.0 TU. The additional data provided by the Operator showed 7 samples were taken of Electric Lake. The Tritium Units ranged from 8.48 to 12.6, with an average of 9.01 TU. The water at JC-1 is currently at about 1.05 TU, and Electric Lake is currently about 9 to 12 TU, which is about an order of magnitude different. While the Tritium data is considerable, it is not conclusive in establishing the source of mine inflows. The Operator must provide an evaluation and interpretation of the Tritium data accompanied by statistical validation to interpret the Tritium data found in the HCI report, the PHC Addendum, and all other data

presented. The PHC must also address changes in Tritium levels and explain the possible reasons for those changes.

Division Comment: It's important to note that Tritium can only be used to age date water as being younger or older than 1953. The following is quoted from "Applied Hydrogeology", Third Edition, C. W. Fetter, 1994. "^{3}H can be used in a qualitative manner to date ground water in the sense that ground water with less than 2 to 4 TU is dated prior to 1953; if the amount is significantly greater than 10 to 20 TU, it has been in contact with the atmosphere since 1953. Because of the great temporal and spatial variations in ^{3}H injected into the atmosphere since 1953, it cannot be used with more precision." The Operator must consider the limitation of Tritium to age date waters in that the only differentiation that can be made is whether the waters are younger or older than 1953. Arguments and conclusions drawn must include this limitation.

^{14}Carbon

Table 1, of the HCI report indicates the following: One in-mine Carbon sample was taken at 3 West Submain with a value of 15.8 pmC (percent modern Carbon). One Carbon sample was also taken from JC-1 with a value of 30.4 pmC and one Carbon sample was taken from JC-2 with a value of 24.3 pmC. One shallow and one deep Carbon sample was taken from Electric Lake. The values were 72.4 and 82.2, respectively. Based on these numbers, the report indicates "Analyses of ^{14}C concentrations also strongly indicate that the waters from the mine and Electric Lake are very different." There is no discussion of what the numbers indicate and how the comparison reaches that conclusion.

PHC Addendum, Appendix A lists twenty-two samples of underground water taken at various locations where water entered the mine. Importantly, all samples in this set were taken from faults, and most are from faults that are a part of the current water inflow situation. Mean Residence Times (age) ranging from 5,900 years to 25,800 years. The Appendix also shows seven roof drips and floor seeps at various locations throughout the mine were also sampled for ^{14}C; they showed ages from 2,500 to 18,500 years.

Applied Hydrogeology, by C.W. Fetter, Third Edition, 1994, indicates considerable complexity in using, and especially interpreting, radiocarbon dating data. While not elaborating on those complexities here, such a definitive conclusion needs to be justified by more than a simple comparison of numbers. The Operator must provide an evaluation and interpretation of the Carbon data accompanied by statistical validation to interpret the Carbon data found in the HCI report, the PHC Addendum, and all other data presented. Laboratory data sheets for all the water samples must also accompany the submittal.

Section 4.0, EVALUATION OF CURRENT AND FUTURE DEWATERING of the report, indicates, "The question of being able to stop, or at least significantly reduce, the 10-Left inflow with pumping has been partly answered by the disappointing results of the James Canyon wells. CFC's current plan is to flood the lower part of the Level 2 mine once mining has been

completed in the 8-Left and 9-Left panels." The report further states, "if water were allowed to pond to the floor level at the north end of the Diagonal Mains, the driving head differential would be reduced by about 95 ft.... and such a reduction in the head differential would decrease the inflow at 10-Left by approximately 1,000 gpm."

Section 4.1, INFLOW TO 10-LEFT of the report, is an attempt to quantify the inflow based on records of power consumption by the pumps. This was done since, "The rate of ground-water inflow has not been monitored with an adequate degree of accuracy and precision over time."

Division Comment: The results are not significant in terms of changing any analysis in this document. It's interesting to note that there is a suggestion of continuous drainage from Mine 1 of about 100 to 150 gpm.

Section 4.2, EFFECTS OF PUMPING OF JC-1 AND JC-2 ON INFLOW TO 10-LEFT of the report concludes, "In summary, an accurate and reliable measure of the effects of pumping from the James Canyon wells on the inflow at 10-Left has yet to be made. Estimates of the decrease in inflow based on three different methods range from about 200 to 800 gpm. HCI is of the opinion that the higher end of the range provides the most reasonable estimate." The report further states, "keeping the wells pumping solely for the purpose of regional dewatering is not justified."

Section 4.3, FLAT CANYON TRACT of the report is a discussion of conditions and methods to dewater the tract to accommodate coal mining. The Division selected items it felt were relevant to quote below:

- "Various water-bearing units in the Starpoint Formation are reasonably well connected hydraulically probably via the more prominent faults, throughout this area."
- "Relatively large quantities of water might have to be managed at the relatively large hydraulic heads that will exist in that down-dip area."
- "Dewatering challenges in the Flat Canyon tract might not be significantly different than those experienced by CFC in the current Level 2 mine."
- "It can be estimated... it would take about 17 years for the water level to decline to the level of the coal in this area."

The last part of section 4.3 indicates, "Planning the most appropriate dewatering system for the Flat Canyon area should consider:"

- "Managing inflow passively vs. actively dewatering in advance of mining."
- "Development of a better method for predicting the occurrence and hydraulic nature of water-bearing faults."
- "Targeting faults vs. dewatering the "source" sandstones."

- "The timing of implementing any active dewatering," and
- "Using wells drilled from surface versus from underground wells."

Section 4.4, WINTER QUARTERS TRACT of the report, is a short discussion that concludes, "Although there are even fewer existing hydrogeologic data for the Winter Quarter tract than for Flat Canyon tract, the hydrologic risk is intuitively lower in the Winter Quarters area."

Section 5.0, PROPOSED ADDITIONAL HYDROGEOLOGIC INVESTIGATION of the report is a consideration of future work. Sections include:

- 5.1 HYDRAULIC TESTING, General Logistics, Drilling and Testing Program,
- 5.2 CONTINUOUS MONITORING,
- 5.3 DRILLING FROM SURFACE, and
- 5.4 NUMERICAL GROUND-WATER FLOW MODELING.

Section 5.4 of the HCI report states, "Surface-water features (such as Electric Lake and numerous perennial creeks and streams) are not simulated in the model."

Division Comment: The Division feels very strongly that Electric Lake is far too significant a hydraulic feature to omit from ground water modeling and from the Probable Hydrologic Consequences (PHC). The Operator must include Electric Lake in the ground water modeling and in the (PHC). The following items must be included:

1. The lake has an active storage of 30,000 acre-feet, with even greater total storage.
2. The surface area varies from about 100 to 455 acres.
3. Lake water is under over 200 ft of hydraulic head on the surface, plus and even greater head when drainage into the ground is considered.
4. At least one of the north-south trending faults in the area passes through the lake and Mine 2 of Skyline Mine. (See plates in HCI report.)
5. Water continuously drains from the lake into the underground water systems.
6. The lake water level is close to the underground potentiometric surface, sometimes within 175 feet. (See HCI report.)

Division Comment: There is an additional consideration that the Division feels very strongly must be included in modeling the ground water system. No discussion has been presented regarding the recharge to the underground aquifer that is postulated in the HCI report. An underground aquifer does not exist as an isolated volume. The discussion has pointed out very large quantities of water, under considerable hydrostatic head, and covering large areas. The Operator must include in their investigation, and in their modeling, consideration of the deep ground water system. The following significant questions must be addressed. Given the complexity of underground water systems, definitive answers may not be possible. Still, these issues must be addressed.

- What is the source of the energy to develop the potentiometric surface?
- Where did the water in the aquifer originally come from?
- Where does this aquifer get its new recharge water?

Future Mine Plans

The Division can only respond to amendments such as the one being evaluated here. During the amendment review process, numerous verbal discussions have taken place that bear on the situation and indicate changes are taking place. Still, it's important for the Operator to understand that the permitting process is an official and written process that modifies the Mining and Reclamation Plan (MRP). The recent submittal of the North Lease (Winter Quarters) makes clear Canyon Fuel's intention to mine there instead of continuing west toward Flat Canyon. Still, there are a number of issues pertaining to Mine 2 that need explanation. The following items are based on the verbal discussions mentioned above. The Operator must address the following in their next submittal.

- What panels will and will not be mined in Mine 2 before operations cease in that mine? Specifically, will panels 11-Left and 12-Left be mined? These are closer to Electric Lake than the 10-Left panel where the largest mine inflow occurred, and there is concern for mining in that location.
- What are the plans to install seals and stoppings in Mine 2? What pumping locations would be associated with such plans? Include a map showing locations and planned installation dates of the seals, stoppings, and pumps.
- What hydrologic changes are expected as a result of the future plans in Mine 2? Specifically, to what elevation will the water level rise in the mine, and what are the anticipated total pumping rates when the water reaches that elevation? Will this water be pumped into Eccles Creek or pumped into Electric Lake? When will all this occur?
- What are the plans to upgrade the James Canyon pumps? How long will the James Canyon wells continue to operate? At what pumping rates?
- What actions will be taken to keep Mine 2 in a condition to facilitate future mining?
- Given the relatively short time of 7 years it will take to mine out the North Lease (Winter Quarters), will mining continue in the Flat Canyon tract? If so, what pumping and other conditions will be needed to mine that tract? What is the estimated time frame for mining Flat Canyon?

Division Considerations

While reviewing the submitted data, the Division made some independent investigations and summaries. They're described below.

A curve of pumping to Eccles Creek vs. time was compared to a curve of Electric Lake water surface elevation vs. time. Both were compared for the period of 8/16/01 to 8/29/02. If there was a direct connection between the lake and the mine, it was thought that a reduction in hydrostatic head of the lake might result in a similar reduction of mine water inflow. No correlation was found even when time lags of different length were considered.

As discussed below, Pacificorp provided their estimate of missing water during the time period from June 19 to August 31, 2002. The estimate was 1,521 acre-feet over that 72-day period. This was compared to the amount of water pumped out to Eccles Creek during the same time period. The pumped amount was 2,860 acre-feet. It can be said that the amount of water unaccounted for in Electric Lake is 53% (1,521/2,860 = 0.53) of the water pumped into Eccles Creek during that time period. While this is an interesting comparison, no conclusions can be drawn. This led to consideration of how long it might take for water to reach the mine, IF there were a connection to the lake via a fault system shown in Pacificorp's Aquatrack study. The distance from the lake to the 10-Left inflow was scaled to be about 9,000 feet. It was assumed that the volume of water flowing was the inflow at 10-Left, about 4,500 gpm. At this point a major assumption was made about the size of the opening that the water might flow through. The result was a transit time of one hour. Even if that estimate were off by a factor of 1000, the water would take 1000 hours, or 42 days to travel from the lake to the mine. Interestingly, this is consistent with the time it took for dye to travel through fractured sandstone faults at Little Bear Spring. There it took less than 40 days to travel 1.5 mile. In our estimate, it takes about 42 days to travel 1.7 mile. Of course, this exercise is in no way conclusive. Still, the water comparisons provide some insight and we have an "order of magnitude" of the water travel time, IF such a connection exists.

The wells in James Canyon pump groundwater only and pipe that water to Electric Lake. All mine inflows are pumped from the mine and discharged into Eccles Creek. The location, date, estimated original inflows, and estimated present inflows are summarized in the following table. These are taken from the amendment Dwg. PHC A-2. Note that, while some individual inflows have decreased, they have not stopped. According to the Operator, this is unlike previous experiences in the mine where water inflows have typically slowed down considerably, and often stopped altogether. Also, previous inflows were much smaller. Prior to 1999, typical total inflows to Skyline Mine were about 300 to 400gpm. It appears that in the last 4 years, as the mining operation continues, more water inflows are encountered, and the total amount of inflow to the mine has increased.

Inflow Location	Date	Estimated Initial Flow, gpm	Estimated Present Flow, gpm	Difference
14-Left HG	03/1999	1,800	1,000	-800
16-Left HG	12/1999	1,600	800	-800
W Submains	03/2000	1,200	800	-400
10-Left	08/2001	4,700	4,700	No Difference
11-Left HG XC22	02/2002	Unknown	1,000	Unknown
11-Left HG XC40	03/2002	Unknown	1,000	Unknown
	Totals	9,300	9,300	

These estimated numbers are consistent with the amount of water being pumped from the mine to Eccles Creek. Every month the Operator provides the Division quantities of the pumped discharges to Eccles Creek and to Electric Lake. The average discharge to Eccles Creek from 8/16/01 to 9/30/02 has been 8,080 gpm with no days without pumping. The average discharge to Electric Lake from 9/16/01 to 9/30/02 has been 2,220 gpm, with 38 days of no pumping.

Pacificorp Investigations

On July 31, 2002, the Division received a packet of charts and graphs from Darce Guymon, Engineering Technician, of Pacificorp. He expressed concern that Electric Lake was losing water and that this might be due to the inflows to Skyline Mine. On September 19, 2002 Pacificorp representatives Rodger Fry, Geologist, and Carly Burton, Hydrologist, came to the Division to discuss concerns they had regarding a possible connection between Electric Lake and Skyline Mine. The Division requested, and Pacificorp provided, copies of their investigations done to that time. These reports are filed in the Skyline Mine Mining and Reclamation Plan. They are summarized below. In the following discussions, "positive inflows" mean that the total inflow to the lake is greater than the total outflow. "Negative inflows" means the total inflow to the lake is less than the total outflow. That is, a negative inflow means the lake is losing water.

Date vs. Calculated Inflow

Division Comment: There is a graph of Date vs. Calculated Inflow, cfs for Electric Lake. The time span is from 1974 to 2001. There is an obvious peak during the spring of every year and inflows are all positive with three exceptions. There are two brief negative spikes, perhaps for one monthly reading, during1989 and 1991. However, in the fall of 2001, the inflows went negative and stayed there for about 5 months. Inflows went positive thereafter as winter precipitation accumulated.

Pacificorp Comment: The gates were closed to begin filling the lake on November 27, 1973. Fall of 2001 was the first time in the history of the lake that inflows went negative and stayed there for any length of time. Since a large inflow of 4,700gpm to Skyline Mine occurred

on August 16, 2001 it's believed the two events might be connected. The inflows are calculated or imputed and not measured. Pacificorp started measuring lake inflows in June 2002.

Elevation vs. Date

Division Comment: There are two graphs of Lake Elevation vs. Date. One covers the time period of 1985 to 1993 and the other from 1994 to 2002. There is an annual rise in elevation as the lake fills each spring. There is also a "flattening" of the curve as the lake empties with water usage each fall. There is a characteristic slope to the flattened part of the graph each year, which shows the rate at which the lake is being emptied. While the slopes during the years 1995 through 2000 remain relatively constant, the slope for 2001 to 2002 is sharply steeper. Approximation from the graph shows it to be about 3.8 times steeper.

Pacificorp Comment: The sharply steeper slope during 2001 to 2002 indicates the lake is emptying much faster during that time period than any other time shown on the graphs. Since the mine had significant inflows during that time, the two occurrences may be connected.

Division Comment: The Division determined the average Palmer Hydrologic Drought Index (PHDI) for each of the years to be as follows:

Year	PHDI	Year	PHDI	Year	PHDI
1985	3.76	1991	-0.96	1997	2.62
1986	3.55	1992	-2.33	1998	3.55
1987	-1.78	1993	2.24	1999	3.55
1988	-3.32	1994	0.05	2000	-1.92
1989	-3.11	1995	3.00	2001	-2.42
1990	-3.21	1996	1.24	Thru 7/2002	-1.5 prelim.

Division Comment: Notice that the 2000 to 2002 time period is a "mild to moderate drought" (as defined by the National Climatic Data Center). This may explain some of the increased slope steepness. The steep 2001 to 2002 slope is also presented on the 1985 to 1993 graph. The flattened slopes during this period vary considerably with one, 1986, being steeper than the rest. When compared to the 2001 to 2002 slope, the latter is 1.6 times steeper. Notice that 1985 and 1986 were markedly wet years and the slope was still steep.

Lost Water

Division Comment: A graph titled, Electric Lake Comparison of Computed vs. Measured Inflows was provided. The vertical axis is CFS of Water and the horizontal axis is Date in 2002. The time span is from June19 to July 27. Another similar graph covers the time period from Aug 01 to Aug 31. A bar on each day shows Computed Inflow, Measured Inflow, and Missing Water. During the period from Aug13 to Aug 25 the Missing Water becomes

noticeably greater. The pump at JC-1 was apparently shut off during this time. This would stop the 2,000-gpm inflow to the lake and logically increase the Missing Water.

Pacificorp Comment: These graphs plot Computed Inflow minus Measured Inflow = Missing Water. Based on these graphs, and other calculations, "Our calculations show over twenty acre-feet per day is being lost for which we cannot account through storage change, releases, or evaporation."

Division Comment: Another graphic was provided by Pacificorp showing the lake conceptually as a bowl. All inflows and outflows are plotted for the time period from June 19 to August 31. The net result is 1521 acre-feet of water missing for that time period. That is 20.8 acre-feet per day of Missing Water. The 1521 acre-feet over 73 days converts to 4,714 gpm. The estimated inflow at 10-Left in Skyline Mine is 4,700 gpm. See Dwg. PHC A-2 of this amendment. **The rate at which water is believed missing from Electric Lake is the same rate as the largest mine inflow.** This is a striking comparison. However, it may just be coincidence since no cause and effect relationship has been established.

Resistivity Survey

Division Comment: At the Division's request, Pacificorp provided a report titled, PACIFICORP, ELECTRIC LAKE RESISTIVITY SURVEY, By Geo-Western, July 2002. Two maps and several sheets of plotted resistivity data accompany the 8-page report. The designations JCR- 1, 2, 3, 4, and 5 are east-west lines located 1,000 feet apart. The entire survey area is located on the east side of Electric Lake between the James Canyon wells to the north and Electric Lake to the south. There is a small portion of the mine workings under the survey area. The west side of the development workings of the 9-Left panel of the mine extend south, crossing JCR-1, going about half way between JCR-1 and JCR-2. This is on the east half of those survey lines. It appears unlikely the workings affected the survey.

The Results and Conclusions section of the report includes the following observations.

- "The area stretching through lines JCR-1, JCR-2 and JCR-2, for a minimum distance of 3,000 feet North to South, and from 4 East to 14 east for an East-West distance of 1000 feet appears to contain considerable water. The center of this zone is cut by the inferred North-South fracture... This fracture is presently producing 2,500 gpm on the same fracture roughly 2,500 feet North of JCR-1."

- "Resistivity and IP data collected over the zone appears to suggest a resistive zone at or below the 8,500 foot elevation mark"

- "Three inferred fractures which are expected to contain fresh water above the 8,500 foot elevation are noted on line JCR-3. All three are expected to contain fresh water at least 300 feet above the 8,500 foot mark and continuing to at least the 600 foot depth."

- "High resistivity intersects on line JCR-4… all indicate the presence of fresh water at least 200 to 300 feet above the 8,500 foot elevation."

Division Comment: The fracture discussed above is the fault that runs between the mine inflow at 10_Left and Electric Lake. The accompanying maps show the same two faults shown in the HCI report that extend through both the mine and the lake. This resistivity study establishes a more accurate and precise location of the faults. In addition, they show 3 inferred fractures between those faults, one inferred fracture west of the west-most fault, and one inferred fracture east of the east-most fault. This establishes the area to be faulted and fractured. IF four of the inferred faults were extended north, they would intersect mine workings in the 9-Left panel. The survey did not go north far enough to verify this.

Division Comment: The Division checked Pacificorp records and determined the average water surface of Electric Lake during July (the time of this survey) was 8,505 feet. The resistivity survey appears to establish that the entire area between the lake and the mine contains "considerable water" at depths below 8,500 feet. Also, there are two main faults and five inferred faults, all north-south trending, in that same area. The elevation of the water found is consistent with the lake surface elevation during the time of the testing. These conditions are all conducive to water transfer from the lake to the mine. However, the resistivity survey did not actually indicate water flows of any kind.

AquaTrack Survey

Division Comment: At the Division's request, Pacificorp provided a report titled, ELECTRIC LAKE SURVEY, DRAFT COPY ONLY. This report was prepared by Sunrise Engineering, Inc., Aqua Track. No date is given, but reportedly the work was done in August 2002. The report is preliminary and consists only of 6 sheets of 11"x17" paper. There is no written narrative and no explanation of the material. The last 4 sheets appear to be cross sections of electric field strength at several locations taken perpendicular to the preferred underground water path.

Pacificorp Comment: Verbal explanation by Rodger Fry, Geologist, indicates the first two sheets are a graphic representation indicating a preferred path for underground water. That is, the electrical signals used in this survey show where water would likely flow underground.

Division Comment: The preferred underground water path runs from Electric Lake to the James Canyon well, which is located directly above the mine inflow at 10-Left. This suggests that there is a path for water to follow between those two locations. However, there are some inconsistencies. The preferred path does not actually follow either of the two main faults between the lake and the mine. Going from north to south, the path crosses the east-most fault twice (at very low angles) and then turns northwest to run alongside the west-most fault. The path ends at the James Canyon wells. These inconsistencies might be explained by the results of

the resistivity survey. That found the whole area to contain "considerable water" and, in addition to the two main faults, there were 5 inferred fractures in the area. These faults and inferred fractures are in the preferred path indicated in this AquaTrack survey.

Division Comment: In order to better understand AquaTrack technology, the Division requested a technical paper titled, "TRACKING, MAPPING, MONITORING, AND DEVELOPING OUR GROUNDWATER RESOURCES." Montgomery, Kofoed, and Sellers authored this paper. It was sent by email from Val O. Kofoed, of Sunrise Engineering, on 9/24/02. The paper is not specific to Pacificorp or to any project. It presents the electromagnetic principles and techniques underlying the AquaTrack technology. While informative and very helpful, the contents will not be reviewed here. Two comments from the paper important to this discussion are presented below.

- The technology "... can be used to...infer the shape, location, and path of the channel or porous zone used by the subsurface water being energized."

- "At this point in the development of AquaTrack, it is not possible to determine the quantity or quality of groundwater present."

Division Comment: These parameters do not include any indication of flow, with attendant direction and amounts.

Division Summary of Investigations

- Before 3/99, typical mine inflows had been low, about 300 to 400 gpm.
- Significant mine inflows began in 3/99. Between 3/99 and 8/01 (3yr., 5mo.) the inflows totaled about 4,600gpm. On 8/16/01 an additional 4,700-gpm inflow began at 10-Left. An additional 2,000 gpm has occurred since then. The total inflow has declined to about 9,000 gpm at the end of September 2002. The inflow at 10-Left has remained constant at 4,700 gpm.
- The mine inflows result in a total of about 9,000 gpm being pumped out of the mine, while the lake is losing about 4,700 gpm. This suggests that, even if Electric Lake were involved, about half of the water (4,300 gpm or 48%) is being drawn from somewhere else.
- All mine inflows are pumped from the mine and discharged into Eccles Creek.
- The James Canyon wells pump groundwater only from the fault near 10-Left. No mine inflow water is involved. This water is piped to Electric Lake at an average 2,220 gpm.
- All of the inflows have occurred in Mine 2. No significant inflows have occurred in Mine 1, which is above Mine 2 and to the east. No significant inflows have occurred in Mine 3, which is north of Mine 2.
- An in-depth hydrogeologic study (HCI) presents considerable evidence to support the existence of a large underground reservoir of water beneath the coal seams. This

underground reservoir appears to provide a potentiometric head to push the water into the mine at the several mine inflows.

- The HCI study delineates a hydrologic system bounded on the west, east and southeast by major regional faults. There are numerous faults and fractures defined inside this system. The ground water is not compartmentalized.
- The HCI study shows water is draining out of the ground at high rates due to mine inflows. Water moves throughout the area vertically and laterally very rapidly when compared to typical underground water movement.
- A potentiometric surface map indicates a distinct drop in elevation from the surrounding area to the mine inflows. The total drop in head is over 300 feet. The shape of the potentiometric contours suggests at least 3 faults contribute to the flow of underground water.
- All 6 mine inflow locations are directly associated with faults.
- Four water chemistry analyses all indicate that Electric Lake waters and mine inflow waters are separate and distinct. This includes Ionic Composition, Isotope Ratios, Tritium, and ^{14}Carbon. Statistical validity is lacking in some of these analyses.
- The first-ever prolonged negative inflow to the lake occurred at about the same time that the largest inflows to Skyline Mine occurred. That is, Fall of 2001. However, those negative inflow calculations are based on calculated or imputed inputs and not on actual measured inputs to the lake.
- Lake water elevations vs. time slopes indicate that Electric Lake was experiencing a markedly increased rate of water loss during 2001 to 2002. Compared to the lake's history, this is the greatest rate of water loss ever. Two years of "mild to moderate drought" explains at least part of this. Still, the lake is experiencing this loss during the same time there are large inflows to Skyline Mine.
- The lake is losing about 4,700 gpm while the largest inflow to the mine is also 4,700 gpm. This is a striking comparison. That mine inflow is also the closest one to the lake, about 9,000 feet (1.7 miles) away along a fault path that intersects both the lake and the mine inflow location.
- The underground water potentiometric surface level and lake level were almost identical during the month of October 2001. Potentiometric surface 8,500 vs. lake level 8,521. Further, the 8,500 ft. potentiometric contour is located about the center of the lake, which is where the water would be physically located. This is a striking comparison.
- The mine elevation at the 10-Left water inflow is 8,043 feet.
- A resistivity survey indicates two major faults running between Electric Lake and the mine. The inflow at 10-Left in the mine is located on one of these major faults. The area also contains 5 inferred fractures and the area between the lake and mine contains considerable water below the 8,500-foot elevation.
- An AquaTrack survey indicates there is a preferred path for water flow between Electric Lake and the water inflow at 10-Left in the mine. While inconsistencies exist in this survey, the preferred path seems valid.

Based on the above investigations, the Division is not yet able to completely and accurately understand conditions in the Hydrologic Regime and validate the Probable Hydrologic Consequences due to mining. It also appears there are two valid, but different, explanations of where the water is coming from that is entering Skyline Mine. One postulates the water is coming from a large underground aquifer composed of numerous sandstone layers beneath the coal seams. The other postulates the water is derived from Electric Lake. Both explanations have considerable sound technical data to support the proposed scenario.

All the investigations suffer from limitations. At this time it is not possible to determine what data best represents the actual situation. The Division has requested a considerable amount of more specific data from the mine Operator. It's believed this additional data will sufficiently describe the Hydrologic Regime in the mine area and potentially identify the source of the water flowing into the mine.

Evaluation of Water Balance for Electric Lake Reservoir

Division Comment: Part of the investigation of a possible connection between the flooding in Skyline Mine and loss of water in Electric Lake was a report by Hydrologic Consultants, Inc. (HCI) titled, DRAFT – Evaluation of Water Balance for Electric Lake Reservoir. HCI is a hydrogeologic consulting firm located in Lakewood, Colorado that has been hired by Canyon Fuel for work at Skyline Mine. The report was received by the Division on August 28, 2002, after the original amendment submittal. It should be noted that the report is DRAFT and, according to the author, is being revised.

The report indicates the investigation was prompted by a July 10, 2002 meeting with Canyon Fuel Co., HCI, and Pacificorp. The report states, "Pacificorp asserted that the level of Electric Lake is unusually low in comparison to levels during other periods of drought even though discharge rates have remained essentially the same." The first section of the report presents the Water Balance Calculated by Pacificorp.

Division Comment: The basic Pacificorp approach is to use the lake as a system and compute the inflows and outflows, which result in "missing water." This term results from 4 dependent variables. In the second section of the report, Evaluation of Pacificorp's Analysis, the point is made that water has been "missing" from the reservoir throughout its history. The report claims "a more comprehensive review and evaluation of the data" and creation of Figure 1, Discharge from Electric Lake and Precipitation from Nearby Station.

The report explains, "During this 28-year period, water levels in the lake have in fact risen when total precipitation exceeded lake discharge by about 30,000 acre-ft/year or more, and water levels have fallen during those times when the difference has been less than 30,000 acre-ft/year."

Division Comment: As shown on Figure 1, this is generally true, but not always true. In 1984 the precipitation exceeded discharge by about 13,000 acre-ft/year (44% greater than 30,000) and the lake did not rise, but remained steady. Similarly, in 1988 the precipitation exceeded discharge by about 7,500 acre-feet/year (25% greater than 30,000) and the lake did not rise, but maintained a continued fall as started 4 years earlier and continued to fall for another 2 years. More importantly, the years 1975, 1976, and 1977 were three consecutive years when the difference was less than 30,000 acre-ft/year by about 6%, and the lake level did not fall but stayed constant. The reservoir gates were closed on November 27, 1973 so the reservoir was filling and outflows from the reservoir were still stabilizing with greater leakage from the reservoir. One would expect the lake level to have been more prone to decline under these conditions and it did not. This contradicts the general trend and weakens the argument.

The third section of the report, Re-Evaluation of Water Balance by HCI suggests "a more generalized water balance equation, one that balances water not just in the reservoir, but in the entire drainage area above the dam".

Division Comment: The "missing water" in this HCI evaluation is determined using 6 dependent variables. The resulting conclusion is that the lake has been losing about 7.0 to 7.8 cfs since the lake was filled. One variable, evapotranspiration, is acknowledged in the report to "comprise a large abstraction relative to yearly precipitation, and of all the following calculations were found to be sensitive to changes in the estimate of the (evapotranspiration) rate." The Pacificorp approach uses the lake as a relatively simple system with inputs and outputs that can be measured directly. Notably some of them have NOT been measured until recently. The HCI approach uses the entire 30+ square-mile drainage area of the entire reservoir and is much more complex. The HCI approach involves inputs that must be estimated, over large areas, and some of the variables are not possible to quantify. The resulting conclusion is that the lake has been losing about 7.0 to 7.8 cfs since the lake was filled. By way of perspective, literally all reservoirs are "leaky". If one pours water from a bucket onto the ground, the water soaks into the ground. A reservoir can be viewed as a large open bucket with the water naturally flowing by gravity out of the reservoir. Reservoirs are commonly grouted or lined to minimize this expected and inevitable outflow.

The fourth and final section of the report is Conclusions. It points out, "The basic assumption of Equation 3(the HCI equation)...is valid only over relatively long periods of time. Therefore Equation 3 cannot be used to calculate an accurate basin water balance over short time periods (i.e., those of approximately three years of less)." Also, evapotranspiration would be expected to be "somewhat higher in wet years and lower in dry years." Reference there is made to Figure 4, Water Losses from Electric Lake vs. Precipitation, "which plots the net water imbalance vs. precipitation, calculated on a yearly basis." There is reference to the "resulting trend".

Division Comment: Although there is no line, the data can be seen to generally form a line from lower left to upper right. This would indicate that in years of less precipitation the missing water, or reservoir leakage, is less than in years of more precipitation.

The report also indicates, "During relatively wet years, Equation 3 will tend to exaggerate water "losses" as a consequence of both more water entering the shallow ground-water system... and slightly higher losses from Et (evapotranspiration). Conversely, during relatively dry years, the calculation will yield low or even negative water "losses"."

Division Comment: In order to better understand this relationship, the Division calculated the average Palmer Hydrologic Drought Index (PHDI) for the 28 years shown on Fig. 4. The PHDI defines wet years as having a PHDI equal to or greater than 1.50, and dry years as having a PHDI equal to or less than –1.50. The PHDI numbers were then plotted on the graph. It was found that all the dry years had water losses that were positive. This included two years of severe drought with PHDIs of -3.32 and –4.95. In addition, there are only 5 negative water loss years during the whole 28-year period. Three of them are normal PHDI years and the other two are positive, with one year having severe wetness of 3.55. These results are not consistent with the HCI assertions regarding the validity of their equation.

Division Comment: Both the Pacificorp and HCI approach to the issue appear valid and based upon sound technical reasoning. Pacificorp relies on "imputed" inflows to the lake, which are not actually measured. The HCI approach is larger, more complex, and subject to estimating error. While both approaches appear indicative, they come up with opposing conclusions. Neither approach is conclusive in proving that the water is, or is not, flowing from Electric Lake into Skyline Mine.

Findings:

The proposed amendment does not meet regulatory requirements. Accordingly, the Permittee must address those deficiencies as found within this Draft Technical Analysis and provide the following, prior to approval, in accordance with the requirements of:

R645-301-728, 724.420, and 724.500, 1) The Operator must expand the scope of the hydrogeologic investigation beyond mining considerations to include regulatory requirements for environmental considerations, especially potential impact to the Hydrologic Balance, **2)** The Operator must provide the Porosity, Specific Yield, and Hydraulic Conductivity of the water bearing formations to justify conclusions regarding their ability or inability to hold and release underground water. This must include formations above and below the coal seams to show the nature of vertical water flow in the area. The application suggests there is better water flow from below than from above the coal seams. Justification for this difference must be provided, **3)** The Operator must provide multiple figures, or a combined figure, showing the changes in potentiometric levels as they occur over time in the mine

area. That time should start before any mine water inflows occurred and continue until the most current month for which data is available, **4)** The coinciding of potentiometric surface and Electric Lake level must be shown in the amendment cross-section drawings and discussed in the Probable Hydrologic Consequences, **5)** The Operator must provide a discussion as to whether surface waters might acquire a slightly different ionic composition, as shown on Piper diagrams, as they move from the surface down through the rock layers in a fault, assuming that were taking place. Include the time-dependence of such possible action, **6)** Due to the small number of data points for sample sets, and the lack of any statistical evaluation of the data, several conclusions cannot be regarded as statistically valid. The Operator must provide statistical validation to support any conclusions for sampling and analyses of Stable Isotope Ratios, Tritium, and Carbon 14. This includes all data submitted in the HCI report, the PHC Addendum, and all other data presented, **7)** The PHC must address changes in Tritium levels and explain possible reasons for those changes, **8)** The Operator must consider the limitation of Tritium to age date waters in that the only differentiation that can be made is whether the waters are younger or older than 1953. Arguments and conclusions drawn must include this limitation, **9)** The Operator must provide Laboratory data sheets for all the water samples analyzed for Tritium and Carbon 14, **10)** The Operator must include Electric Lake in the ground water modeling and in the PHC. Both must include total storage capacity contributing to the groundwater, surface area contacting the ground, hydrostatic head relative to underground water systems, and faults intersecting the lake that could contribute water to underground system, especially those that intersect the lake and the mine, **11)** The Operator must include in their investigation, and in their modeling, the following considerations regarding the underground aquifer described in the HCI report: What is the source of the energy to develop the potentiometric surface? Where did the water in the aquifer originally come from? Where does this aquifer get its new recharge water? **12)** The Operator must address the following in their next submittal. What panels will and will not be mined in Mine 2 before operations cease in that mine? Specifically, will panels 11-Left and 12-Left be mined? What are the plans to install seals and stoppings in Mine 2? What pumping locations would be associated with such plans? Include a map showing locations and planned installation dates of the seals, stoppings, and pumps. What hydrologic changes are expected as a result of the future plans in Mine 2? Specifically, to what elevation will the water level rise in the mine, and what are the anticipated total pumping rates when the water reaches that elevation? Will this water be pumped into Eccles Creek or pumped into Electric Lake? When will all this occur? What are the plans to upgrade the James Canyon pumps? How long will the James Canyon wells continue to operate? At what pumping rates? What actions will be taken to keep Mine 2 in a condition to facilitate future mining? Given the relatively short time of 7 years it will take to mine out the North Lease (Winter Quarters), will mining continue in the Flat Canyon tract? If

so, what pumping and other conditions will be needed to mine that tract? What is the estimated time frame for mining Flat Canyon?

OPERATION PLAN

FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

Analysis:

Protection and Enhancement Plan

The recommended seasonal buffer for the goshawk and red-tailed hawk is March 1 to August 15. Assuming operations continue as reported no protection plan will be required in James Canyon further than keeping the road gated and locked (page 2-99(a)) to restrict public assess. The Forest Service has stated keeping the gate locked is sufficient to protect raptor nests in near by canyons.

All electric power lines to the James Canyon wells are buried.

The MRP (page 2-71) commits to conducting macroinvertebrate studies and fish studies in James Creek for 2 years beginning in October 2000 and then every three years thereafter. This should identify any slow degradation of the creek due to sedimentation, should it occur. Unfortunately, adequate baseline data was not obtained prior to mining activities. Mt. Nebo Scientific, Inc collected the data for the first two years. Dr. Dennis Shiozawa conducted the surveys. The October 17, 2000 and 2001 (2001 Annual Report) reports found James Creek to be in excellent condition, Table 1 summarizes the sampling.

Table 1. Summary of aquatic resource sampling on James Creek in 2000 and 2001.

Date	Macroinvertebrate #/m^2	Biomass (g/m^2)	Total Fish
Fall 2000	378,510*	272	587
Spring 2001**	335,000		
Fall 2001	127,875	256	93

*Used summary data from Fall 2001 report, because Fall 2000 report indicates 34,757/m^2.
** Spring 2001 report not found; used summary data from Fall 2001 report.

The 2001 report provides several explanations for the decrease in macroinvertebrate and fish numbers and cannot directly attribute the decrease to mining activities. The large amount of

drilling fluids that spilled into James Canyon was not mentioned or accounted for in this study. However, a subsequent conversation with Dr. Shiozawa indicates that the drilling fluids could have influenced the fish numbers.

Because of the lack of adequate baseline data and the dramatic decrease in numbers of macros and fish for Fall 2002 these baseline studies should continue.

Wetlands and Habitats of Unusually High Value for Fish and Wildlife

The MRP states that low flows in Eccles Creek are often 2 cfs in late summer and fall and high flows seldom exceed 50 cfs (page 2-65). Current discharges are 13 to 20 cfs into Eccles Creek. Eccles Creek is a tributary to Mud Creek and Mud Creek flows directly into Scofield Reservoir. Scofield Reservoir is:

- A culinary water source
- One of the top four trout fishing lakes in Utah
- Has over a one million dollar recreational fishing value (E-mail from Louis Berg to Susan White dated February 4, 2002).

The PHC prepared by the Permittee dated November 2001 states (page PHC A-15) that:

"Significant erosion has not been noted in the stream channel. However, if the high discharge volumes continue, erosion of the stream channel will occur at a rate faster than would occur without the mine water discharge. Since the stream channel is well armored and vegetated, increased bank erosion should still occur only at a very slow rate. The Mud Creek channel will need to be monitored closely for increased rates of erosion. Mitigation efforts may be required for both streams if significant erosion is observed".

In the Division's April 1, 2002 Technical Analysis the Permittee was asked to describe:

1. How the Operator will avoid or minimize disturbance and adverse impacts to fish and related environmental values during coal mining in Eccles and Mud Creek.
2. How enhancement and restoration of Eccles and Mud Creek will be achieved.
3. Protective measures to Eccles and Mud Creek during mining.

The Permittee responded in a letter stating until adverse impacts are noted no enhancement, restoration or protective measures will be necessary. Currently three studies are being conducted on Eccles Creek and one study on Mud Creek to address impacts related to the discharge.

The Permittee submitted A Compilation and Comparison of Eccles Creek Macro-Invertebrate Data for the Period of 1979 – 2002 on August 27, 2002 as required by a 2002 condition to the Permit. The compilation and comparison by Dr. Shiozawa was difficult because

different procedures, analytical approaches, sampling station designation, and creek conditions occurred throughout the 23 year time span. During this 23 year time span data was collected on 24 site visits. The report documents that Eccles Creek has undergone a progressive change in benthic community structure. Total numbers and species diversity have decreased and species dominance has shifted. Although the mine is likely the dominant influence on this creek other factors including, floods, drought, roads, and other mines may and likely have impacted the stream. The report demonstrates the resilience and adaptability of Eccles Creek to disturbance. The report also shows that the macroinvertebrate species and numbers have changed in Eccles Creek since mining began.

The Permittee has committed to a three year macroinvertebrate sampling of Eccles Creek beginning in spring 2002.

Findings:

Information provided in the application is not considered adequate to meet the minimum Fish and Wildlife requirements of the regulations. The following Permit Stipulation is recommended:

R645-301-333, The Permittee must continue macroinvetebrate sampling in Eccles and James Canyon until a trend in populations can be established. Permanent sampling stations must be identified. Permanent sampling stations and methodology for current and any future macroinvetebrate sampling must be described in the MRP.

R645-301-333, The MRP must provide a reference to the report titled A Compilation and Comparison of Eccles Creek Macro-Invertebrate Data for the Period of 1979 – 2002.

R645-301-333, The Permittee must conduct fish studies on Eccles Creek and compare this to all historic studies done on this creek.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Drill Site

Drawing #1.6-3 shows the site location. Plate #3.4-1 shows the location of the well site and topsoil storage pile along the road.

Development of the well site is described on page 3-63 (a). The site includes a drill pad (100' X 200'), sediment pond, undisturbed drainage ditch and 18 inch culvert. Two water wells were drilled, JC-1 and JC-2. Topsoil was removed to a depth of 6.5 inches (on the average) from the drill pad area (page 2-120 (f).

The soil survey (Appendix 2) reports that in the vicinity of the well site, the topsoil is between 16 and 24 inches in depth (Aspen soil). For the 20,000 square foot area of the well site, there would have been approximately 30,000 to 40,000 cubic feet of available topsoil or approximately 1,000 cubic yards of topsoil salvaged and stored on site.

The plan reports that 100 yards of topsoil is stored at the staging area in a pile that is 50'x 11'x 5'deep (page 2-120 f). Given the fact that 6.5 inches of topsoil was salvaged from the 20,000 sq ft area shown on Plate 3.4-1, there should be a pile that contains 400 cu yds of topsoil. By the Division's calculations, there was an average of 0.12 inches removed from the 20,000 sq ft drill site to create a pile that contains 100 cu yds. Indeed, the plan describes the replacement of 1.65 inches of salvaged topsoil to the site (Section 4-20, page 4-30 (a)).

The Permittee explains that the reduction in material is due to the previous disturbance of the site (pp 2-120 (f). The Division's opinion is that the available topsoil material was squandered during construction of the site.

Pipeline

The 16-inch polypipe is buried for a distance of about a half mile along the James Canyon road from the drill site to the dewatering site at Electric Lake in Section 35, T.13S, R6E.

For polypipe burial, the plan indicates that the top few inches of soil on the flat portions of the road (page 2-120 j) were salvaged and the subsoil was removed to a depth of three feet and replaced. A contradictory statement is found in the plan on page 4-30 (b) where a statement is made that "no topsoil existed therefore none was removed during construction [of the pipeline]."

Power Cable

The power cable is buried in the road in James Canyon in the SW1/4 SE1/4 of Section 25, T13 South R6 East. The present configuration of the road is 19 feet wide with ditches on both sides. The ditches have 1:1 side slopes. There is four inches of road base on the roads (IB01I-1). The power line was buried 30 – 40 inches deep, in an eight inch wide trench (page 2-120 j). Power cable was laid in the bottom of the trench and the trench was backfilled.

The buried power line runs from the power pole for a distance of 4,400 feet along the James Canyon road (page 3-63a)) to the well site (a total distance of approximately 1.2 miles).

DWG 1.6-3 indicates that a portion of the James Canyon road was not initially in the permit area, but was incorporated into the permit area as a result of this activity.

Stipulations were placed on the power cable installation and burial by the U.S. Forest Service in a letter to Mary Ann Wright of the Division, dated October 15, 2001, signed by Elaine Zieroth, Forest Supervisor. For the portion of the power cable burial falling within the mine permit boundary, the following soils issues were stipulated by the Forest Service:

- Typical details showing the depth of burial and trench relative to the road
- Plan for protecting the topsoil berm an the outer edge of the road and
- Seeding of the topsoil berm and cutslope of the road prior to winter.

The submittal describes the trench on pages 3-28 (b) through 3-28 (e). Page 4-30 states, "soil was removed from the road surface and pushed to the side for use as a temporary berm." The topsoil was stored in a berm approximately 2 feet four inches high (as shown in cross-sections on pages 3-63 c –f) along the outslope of the road. As described on page 2-120 (f) and 2-63 (b), the outslope of the road was protected from erosion by reseeding with the seed mix shown on page 2-63 (e). During reclamation of the road (page 4.30a) the berm will become the topsoil, so protection during operations is quite critical.

Findings:

Information provided with the submittal is not adequate for the purposes of Operations Topsoil and Subsoil handling requirements of the Regulations. Prior to approval, the Permittee must provide the following information in accordance with:

R645-301-230, 1) Correct the discrepancy between statements made on pages 4-30(b) and 2-120 (j) concerning the amount of topsoil removed from the pipeline disturbance. **2)** The plan reports an average of 6.5 inches salvaged from the 20,000 sq ft drill pad on page 2-120 (f). This should have created a pile containing 400 cu yds, but the plan reports a 100 cu yd of topsoil stored. Correct the statement on page 2-120 (f) to reflect that an average of one inch of topsoil was salvaged from the site. Provide an explanation for the limited amount of topsoil stored for reclamation of the site and develop a reclamation plan to reduce compaction and enhance the drill site pad with organic matter amendments since very little topsoil was salvaged from the site.

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:

Impounding structures

A sediment pond was constructed at the drill site. The pond served to capture the drilling fluids produced during well development. Before reclamation of the site, the sediments in the pond will be sampled and analyzed using methods outlined on Table 6 of the Division's Approved Soil and Overburden Handling Guidelines, dated 1988. Table 6 includes the following parameters: pH; Electrical Conductivity; Saturation Percentage; Particle Size Analysis; Soluble calcium, magnesium, and sodium; Sodium Adsorption Ratio; Selenium; Total Nitrogen; Nitrate-Nitrogen; Boron; Maximum Acid Potential; Neutralization Potential; Organic Carbon; Exchangeable Sodium; Available Water Capacity; and Rock Fragments.

Findings:

Information provided with the submittal is adequate for the purposes of Operations Spoil and Waste Materials handling requirements of the Regulations.

RECLAMATION PLAN

GENERAL REQUIREMENTS

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

Analysis:

As per the (undated) Addition to the U.S. Department of Agriculture Forest Service Special Use Permit dated October 21, 1976, the road surface from well site to Electric Lake was restored to its pre-trench condition. During final reclamation, the trench will be excavated for a distance of 100 feet (at both ends) and the pipe will be plugged at both ends with cement. Soil excavated from the trench will be replaced so that the surface soil is on top again.

PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES

Regulatory Reference: 30 CFR Sec. 817.97; R645-301-333, -301-342, -301-358.

Analysis:

Fish and Wildlife enhancement measures during reclamation for the James Canyon road, pipeline, and well are not addressed. Enhancement measures could include shrub plantings or other methods of enhancement. The State's Lone Peak Nursery custom grows specific species provided sufficient lead time. Information can be obtained from: http://www.nr.utah.gov/slf/Forestry%20Fire%20&%20State%20Lands_files/lonepeak/Home2.htm Bitterroot Restoration at: http://www.revegetation.com/BRIWeb/plant_prop.html also contract grows plants. In the July 8, 2002 letter from Skyline addressing these deficiencies reference is given to Sections 4.1 and 4.18 of the MRP. No fish and/or wildlife enhancement measures were discussed in these sections.

Because the pipeline burial reclamation was done prior to resolution of the deficiencies, no surface mulch was used. Since James Canyon is critical breeding habitat for the Yellowstone cutthroat this area will need to be observed and remedial action taken if erosion is noticed. Surface mulch must be used in reclamation of the road and pipeline.

Findings:

R645-301-342.100, Fish and wildlife enhancement measures used during reclamation must be described.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Redistribution

The reclamation plan for the James Canyon Road and Drill Pad is outlined on page 4-30a:

- The topsoil (berm) will be "set aside."
- The gravel road surface will be pushed to the inside of the road cut.
- The road outslope of the road will be pulled up onto the road.

The average depth of topsoil and subsoil replacement is as follows (page 4-30 (a) & (b):

Drill pad = 1/65 inches

Pipeline = 0

Powerline = use road berm

Staging area (topsoil pile location) = 2.6 inches

There is very little topsoil being replaced at the site, although the area was rich with topsoil prior to disturbance (see Appendix A-2). The Permittee must provide for no compaction in the upper four feet of the root zone and for some organic amendment to the site to replace the squandered topsoil (see deficiency under R645-301-230, #2)

Findings:

Information provided with the submittal is not adequate for the purposes of Operations Topsoil and Subsoil handling requirements of the Regulations. Prior to approval, the Permittee must provide the following information in accordance with:

R645-301-240, The plan must indicate that the top four feet of reclaim surface will not be compacted.

REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

General Requirements

A seed mixture for the James Canyon was developed in coordination with the Forest Service (page 2-63(d). It is crucial that the Permittee be vigilant with a weed control program. The Weed Web at: http://extension.usu.edu/coop/ag/crops/weedweb/index.htm provides current information for weed control programs.

Timing

Final seeding of the buried pipeline was completed in November 2001. Seeding of other areas in James Canyon will be done in the fall. The powerline trench was compacted and graded in the fall; no seeding was required. The fall is considered the normal time of seeding for this area.

Mulching and other soil stabilizing practices

Soil preparation will include surface roughening. Extreme surface roughening should stabilize the soil surface or limit sediment runoff to the bottom of each basin. A surface mulch will be used as additional control because of the sensitivity of James Creek. Certified weed-free (usually only noxious weed-free) straw or alfalfa mulch and/or hydromulch will be spread or sprayed on the reclaimed surface. Straw or hay will be applied at the rate of 1500 pounds per acre. No rate is specified for hydromulch application if straw or hay is not used.

Standards for success

The application provides a reference area for the James Canyon disturbance but fails to make a demonstration that the reference area is equal to or exceeds the vegetation cover,

diversity, density and/or productivity of the disturbed area. This site was not previously disturbed by coal mining activities and will not be exempted from productivity, diversity or any other performance standards. The revegetation standard is based on a reference area yet the application states a standard of 58 percent. This should be removed and stated that the cover of the reference area at the time of bond release will be used. The bond releases standard is total cover of the reference area and not just understory cover, productivity and shrub/tree density. Productivity (as measured by methods described in the Division's Vegetation Information Guidelines) of the reclaimed area must equal or exceed 90 percent (using a one sided 90 percent confidence interval) of the productivity of the reference area for two consecutive years prior to bond release.

Findings:

Information provided in the application is not considered adequate to meet the minimum Revegetation requirements of the regulations. Prior to approval, the Permittee must provide the following in accordance with:

R645-301-355, The Permittee must provide a rate of hydromulch application if used as surface mulch during reclamation in James Canyon.

R645-301-356, The Permittee must correctly describe the success standard required for bond release.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

Waterbars are a Best Management Practice for operational activities. They require maintenance and removal when the operation is concluded. The use of waterbars in reclamation is not appropriate. Mine sites in Utah successfully use an extreme surface roughening technique instead of waterbars. The roughening process can occur during topsoil placement or while incorporating organic materials (i.e. hay). Surface roughening also eliminates trespass off road vehicle use. Proper roughening is described in the technique sheets in the Division's reclamation manual, The Practical Guide to Reclamation in Utah, found at: ftp://dogm.nr.state.ut.us/PUB/MINES/Coal_Related/RecMan/Reclamation_Manual.PDF . The technique sheets are also useful to give to equipment operators to illustrate the degree of roughness required.

Page 2-120 (j) states that the James Canyon road was roughened from the drill site down to Electric Lake with gouges made by a track hoe. Water bars were re-constructed and silt fences were positioned at the outflow of each water bar (page 3-63 b). The road was re-seeded. The date of seeding was not indicated.

The James Canyon road disturbance is considered ASCA #34 and 35 (page 3-72 C). Silt fences will be maintained three times a year until vegetation is adequate to control erosion (page 3-64).

Findings:

Before approval, the Permittee must provide the following in accordance with:

R645-301-355, The Permittee must provide a commitment to remove the waterbars at Phase II bond release or at reclamation.

R645-301-244, The Plan indicates on page 2-63(b) that reclamation work was completed by September 14, 2001. The seed mix was not developed for the site until October 15, 2001. If the seeding was accomplished by September 14, 2001, please indicate what seed was used in reclamation of the site. If the seed mix described on page 2-63(e) was used, please indicate the correct date of seeding.

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:

Bonded Area Map

The bonded area is usually the same as the disturbed area boundaries. Because the disturbed area boundary is long and narrow the Division will wave the usual requirement to have the map at a scale of 1" = 100' of greater.

The disturbed area for the James Canyon site is shown on Plate 3.4-1, James Canyon Disturbed Area Map. The map is at a scale of 1" = 300'.

On Drawing No. 1.6-3, the Permittee list the permitted and disturbed areas and acreages for the Skyline Mine. List on the drawing are the following for the James Canyon acres:

- James Canyon buried pipeline 1.60 disturbed acres.
- James Canyon buried power line 0.30 disturbed acres.
- James Canyon water well and road 2.96 disturbed acres.

Reclamation Backfilling And Grading Maps

Usually the Division requires that the Permittee provide maps and cross-sections for the disturbed area boundaries that are at a scale of 1 inch = 100 feet. Because the site is very long and narrow and disturbance will be limited to installation of the pipeline the Division will not require detailed maps and cross-sections for the site.

Drawing No. 1.6-3, Skyline Mines Permit Area Map, show the location of the pipeline and the associated trail. On Page 3-80 (b), the Permittee show a typical cross section for the site. Both the cross-sections and map were certified. The maps are adequate for the Division to analyze the reclamation plan

Final Surface Configuration Maps

Because the disturbed area is long and narrow and most of the disturbance is confined to reclaiming the road, the Division will not require any detailed surface configuration maps. In general the road should be reclaimed the pre disturbance topography.

Findings:

The information provided in the PAP is considered adequate to meet the minimum requirements of this section of the regulations.

BONDING AND INSURANCE REQUIREMENTS

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

Analysis:

Determination of Bond Amount

The Division reviewed the reclamation cost estimate submitted by the Permittee. The Division determined that the reclamation cost for the James Canyon area is $7010. The USFS also has a $10,000 bond for the James Canyon area. The Division currently has a $5,076,000

bond for the Skyline mine. The addition bond increase is considered minor enough to be ignored at this time. The Division is in the process of revising the Skyline mine as part of the permit renewal. A complete review of the bond will occur during the renewal process.

Findings:

The Permittee met the minimum requirement for this section.