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**BLUE BLAZE COAL CO.
P.O. Box 784
Price, Utah 84501
Ph. 801-472-3786**

March 20, 1992

Division of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

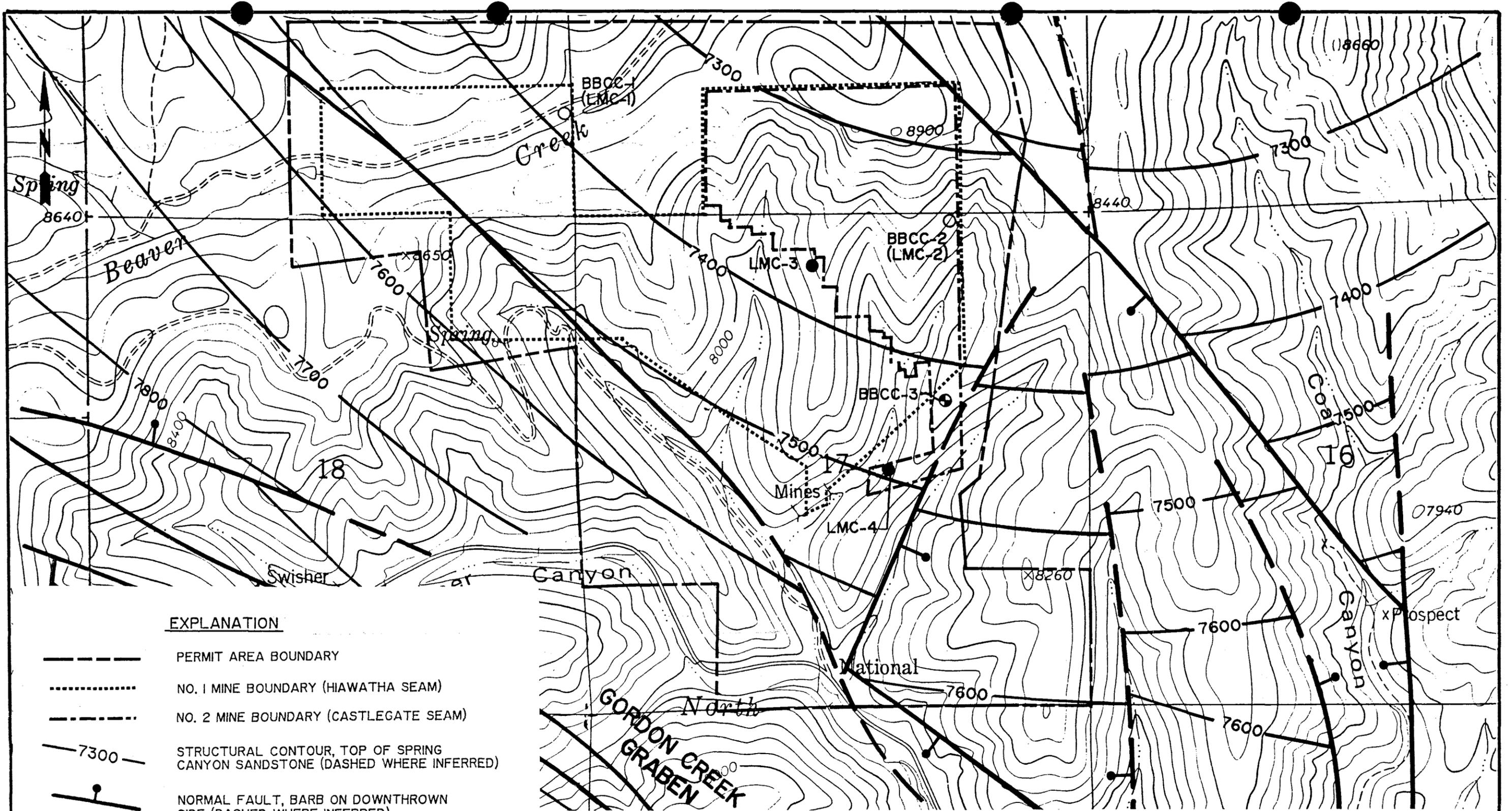
Dear Ms. Grubaugh-Littig:

As per my conversation with Tom Munson on March 20, 1992,
I hereby authorize a copy of any comments on the latest
hydrology reports to be submitted to Earthfax.

Please fax this information to either Richard White or Chris
Flower. Their Fax No. is 561-1861 and their Phone No. is
561-1555.

Sincerely,

William R. Skaggs
William R. Skaggs



EXPLANATION

- PERMIT AREA BOUNDARY
- NO. 1 MINE BOUNDARY (HIAWATHA SEAM)
- - - - NO. 2 MINE BOUNDARY (CASTLEGATE SEAM)
- 7300 - STRUCTURAL CONTOUR, TOP OF SPRING CANYON SANDSTONE (DASHED WHERE INFERRED)
- ┆ NORMAL FAULT, BARB ON DOWNTHROWN SIDE (DASHED WHERE INFERRED)
- EXISTING DRILL HOLE (TO BE MONITORED AS IS)
- EXISTING DRILL HOLE (TO BE DEEPEMED AND CONVERTED TO MONITORING WELL)
- ⊕ PROPOSED IN-MINE MONITORING WELL

BASE MAP:
USGS QUADRANGLE
JUMP CREEK, UTAH-1979



GEOLOGY FROM HANSEN (1988)

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FIGURE 1. GEOLOGY AND PROPOSED MONITORING WELL LOCATIONS

approximately 15 feet above the top of the screen. Pelletized or slurried bentonite will then be emplaced via tremie pipe to a thickness of about 5 feet on top of the filter pack. The remainder of the annulus between the drill-hole wall and the casing will then be sealed with neat cement, with approximately 5 percent bentonite added to reduce shrinkage. A 2-inch diameter lockable protective surface casing will be installed on the completed hole as indicated above for LMC-3 and LMC-4.

Assuming the permit is written to allow initial access to the Castlegate A seam via the Blue Blaze No. 2 Mine, a third monitoring well (BBCC-3) will be installed within the Blue Blaze No. 2 Mine (Castlegate A seam) at the location shown on Figure 1. This location was chosen to be within a cross cut of the main entries at a point that is as far south as possible without encountering the existing underlying mine workings of the old National Coal Company Mine (compare with Plate 3-3 of the permit application). By placing the well within a main cross cut near the mine entry, access to the well will be maintained throughout operations in the mine.

Figure 1 shows structural contours and surface fracture locations as obtained from Hansen (1988). Assuming a groundwater flow direction that is similar to the structural dip, the location of BBCC-3 should allow adequate triangulation with BBCC-1 and BBCC-2 to permit delineation of the potentiometric surface of the Star Point Sandstone within the mine areas. If necessary, the location of BBCC-3 will be revised northward a short distance to ensure that the well is placed on the same side as BBCC-1 and BBCC-2 of the major fault systems defining the No. 1 Mine boundaries. This will allow better correlation between the three wells.

BBCC-3 will be drilled to a minimum diameter of 4 inches and will extend to a depth of approximately 30 feet into the uppermost saturated zone beneath the Hiawatha seam (thus being consistent with BBCC-1 and BBCC-2). Due to the anticipate depth to water in this hole (probably less than 300 feet), it is considered practical to collected water-quality samples from BBCC-3. Thus, this monitoring well will be completed using 2-inch diameter PVC casing and slotted screen. Filter pack, bentonite, and neat cement will be added to the annular space using a tremie line as indicated above. BBCC-3 will be completed at the surface with a waterproof flush-mounted protective cover to prevent damage by mine traffic.

Following drilling, each hole will be surveyed to provide horizontal and vertical control. Future water-level measurements will then be corrected to elevations to permit development of potentiometric surface maps.

During the baseline monitoring period, water-level data will be collected from BBCC-1 and BBCC-2, while data collected from BBCC-3 will be in accordance with Table 2. These data will be collected once each quarter when the wells are accessible. Although it is normally desirable to collect baseline data for a period of two years, it is proposed that the baseline data be collected from the monitoring wells for a period of one year. Justification for this baseline period is as follows:

- o The primary groundwater concern associated with mining in the Hiawatha seam is the potential for significant inflows to occur to the mine such as occurred at the Gordon Creek #3 Mine (see the March 11 submittal). This type of inflow (sudden and sustained inflow from a fracture through the floor in a mine that

was otherwise dry) can be expected only if mining encounters a fracture that is hydraulically connected to an overpressured lens beneath the coal (probably a sandstone lens of the Star Point Sandstone that is confined beneath a shale tongue). If this condition exists within the permit area and the pressure is sufficient to cause significant inflows to proposed mine workings, the water level should rise well above the base of the Hiawatha seam nearly immediately upon completion of the monitoring wells (i.e., well before even the first year of baseline data collection). Thus, a year of baseline data should be adequate to predict potential impacts.

- o Primary reserves on the property are in the Hiawatha seam. Thus, it is desirable to access the lower seam as soon as possible. It is anticipated that approximately 6 months of time will be required from the time mining begins until the two above-ground holes are deepened and the in-mine hole is accessed and drilled. Considering potential delays (due to access, weather, etc.), start-up times for the additional mine, etc., it is probable that mining in the Hiawatha seam could not begin for a period of 1.5 to 2 years following access to the Castlegate seam with a one-year baseline period. Avoiding an additional year of delay to the Hiawatha seam during baseline monitoring would be desirable.

Following the baseline period, water-level data will be collected from BBCC-1 and BBCC-2 and water-level and quality data will be collected from BBCC-3 in accordance with Table 1 once each calendar quarter that the holes are accessible during mining operations. If the baseline data suggest that an alternative to Table 1 is appropriate for BBCC-3, this alternative will be proposed to the Division prior to implementation.

By the end of each month following each calendar quarter (i.e., April 30, July 31, October 31, and January 31), a report will be submitted to the Division summarizing monitoring activities during the previous quarter. These reports will include field measurements, observations, and analytical results received during the previous quarter. If any data indicate non-compliance with permit conditions, Blue Blaze Coal Company will promptly notify the Division and take appropriate actions as provided for in R645-300-145 and R645-301-731.

Response to Comment 724.100 Baseline Information: Groundwater

The Division recommends that additional groundwater information be submitted "that include, at a minimum, approximate rates of discharge or usage and depth to the water in the coal seam, and each water-bearing stratum above and potentially impacted stratum below the coal seam". The Division has correctly stated in the "Applicant's Proposal" section of this comment that "four drill holes (LMC 1-4) are described, *three of which were left open and water level data collected* (pages 4-6). Water rights are discussed on page 7 *in regards to approximate rates of discharge or use*" (italics and bolding added). However, in contradiction to that statement, the Division then states in the "Compliance" section of this comment that "the applicant *has not* obtained the depth to water in the coal seam, each water-bearing stratum above and potentially impact stratum below the coal seam *because the drill holes were plugged to depths above the Castlegate 'A' and Hiawatha seams in holes LMC 1, 2, and 3. In regards to the Star Point Sandstone, no data was* [sic] *provided from the drill holes*" (italics and bolding added).

Table 1 of the Division's comment is repeated herein as Table 3. Note that, while holes LMC-1 and LMC-2 were plugged above the Castlegate A and Hiawatha seams as indicated in the Division's comment, the table indicates that hole LMC-3 was plugged below the Castlegate A seam and hole LMC-4 was plugged below the Hiawatha seam.

It is our belief that adequate data have been submitted to indicate that the Castlegate A seam will be dry during mining (with the exception of limited areas of inflow from localized perched layers). The groundwater monitoring program discussed previously in this letter has been proposed to more fully address questions regarding the occurrence of groundwater beneath the Hiawatha seam. To recap the depth to water information contained in the March 11 submittal, please note the following:

- o As stated in the first paragraph of page 5 of the March 11 submittal, depth to water measurements were collected by EarthFax Engineering on February 27, 1992 in holes LMC-1, LMC-3, and LMC-4 using an electric water-level indicator. Each hole was found to be dry on this occasion at the measured depth of the hole indicated in Table 1.
- o As stated in the second paragraph of page 5 of the March 11 submittal, each of the three holes is open from its bottom to the surface. "Thus, the measured dry conditions are indicative not only of the bottoms of the holes but also each overlying layer penetrated by the holes." Hence:
 - The measurement collected in hole LMC-1 indicates that the Blackhawk Formation at that location is dry above the Castlegate A seam (the uppermost of the two seams proposed to be mined).
 - The measurement collected in hole LMC-3 indicates that the Blackhawk Formation at that location is dry above and within the Castlegate A seam.
 - The measurement collected in hole LMC-4 indicates that the Blackhawk Formation at that location is dry above, below, and within the Hiawatha seam as well as above, below, and within the Castlegate A seam.

Thus, water-level data have been collected from zones above, within, and immediately below the coal seams.

- o As stated in the third paragraph of page 5 of the March 11 submittal, measurements collected from holes LMC-1 and LMC-3 (i.e., above and within the Castlegate A seam) in December 1991 (although using non-standard techniques) indicated that these holes were dry at this time.
- o As stated in the fourth paragraph of page 5 of the March 11 submittal, each hole was dry during drilling. Appendix A of the March 11 submittal indicates that holes LMC-2, LMC-3, and LMC-4 each penetrated the Star Point Sandstone during drilling (extending 39 feet into the Star Point at LMC-2, 33 feet at LMC-3, and 30 feet at LMC-4). Thus, the upper 30 to 40 feet of the Star Point

TABLE 3
DRILL HOLE EVALUATION

Hole ID	Date Drilled	Depth Drilled	Depth of Plug	Measured Depth	Castlegate Depth	Hiawatha Depth
LMC-1	Sep 1976	900 ft	600 ft	599 ft	793 ft	856 ft
LMC-2	Oct 1976	568 ft	50 ft	None	369.9 ft	435 ft
LMC-3	Nov 1976	836 ft	665 ft	664 ft	630 ft	701.9 ft
LMC-4	Jan 1980	430 ft	220 ft	217 ft	105.2 ft	139.2 ft

Sandstone is dry at the location of holes LMC-2, LMC-3, and LMC-4. Further information regarding Mr. Harvey's statements and the dry nature of the holes during drilling will be presented in this letter in response to the Division's Comment 728.

- o As stated in the first full paragraph of page 6 of the March 11 submittal, "the Gordon Creek #2 Mine (operated by Beaver Creek Coal Company in the Castlegate A seam) immediately southwest of the proposed permit area was a dry mine with only sporadic occurrences of groundwater inflow that dried up within a short time. The Gordon Creek #3 Mine (operated by Beaver Creek Coal Company in the Hiawatha seam immediately east of the proposed permit area) was dry until a 12-foot graben was encountered in the northeast portion of the mine." Thus, extensive mine workings adjacent to the proposed permit area indicated that the Castlegate A seam is dry except for limited perched zones. Furthermore, extensive mine workings in the Hiawatha seam indicated that it was dry until a specific fracture was encountered.
- o As stated in the final paragraph of page 6 of the March 11 submittal, "based on the LMC drill-hole water level measurements and information concerning the adjacent mines, it is concluded that both the Castlegate A and Hiawatha coal seams as well as the immediately underlying and overlying strata, are dry. The long history of mining in the area and the periodic measurements from the drill holes suggest that these seams and strata are not seasonally saturated. The occurrence of groundwater while mining in the Castlegate A and Hiawatha coal seams will depend primarily on whether a faulted zone is encountered that contains groundwater in storage or that is hydraulically connected with an overlying perched zone. Based on the dry nature of previous mine workings in the area, as well as observations and measurements obtained from the LMC drill holes, ***the probability of significant sustained inflows to the Blue Blaze mines is considered minimal. This conclusion is in agreement with Cumulative Hydrologic Impact Assessments prepared for the area by Engineering Science (1984) and UDOGM (1989)***" (italics and bolding added).

Thus, all available information submitted to date indicates that the Castlegate A seam will be essentially dry during mining. The monitoring program proposed above will be installed to assess the potential for groundwater inflows to occur during mining of the Hiawatha seam. Blue Blaze Coal Company therefore requests that the Division issue the permit to mine with access granted immediately to the Castlegate A seam via the No. 2 Mine. Blue Blaze proposes that a stipulation be placed on mining within the Hiawatha seam (the No. 1 Mine) until after the collection of one year of baseline groundwater information (in accordance with the above-proposed monitoring program) and completion of a PHC utilizing these data to predict potential hydrologic impacts from mining in the Hiawatha seam.

To recap the discharge and usage information:

- o As noted in the first paragraph of page 7 of the March 11 submittal, three springs have been located within the proposed permit area and are monitored by Blue Blaze Coal Company. Discharges associated with these springs has

typically varied from 5 to 15 gallons per minute at Station No. 1 and from 1 to 2 gallons per minute at Station Nos. 2 and 4.

- o As noted in the second paragraph of page 7 of the March 11 submittal, water rights exist for a limited number of springs in the permit and adjacent areas. These rights are all for flows of less than 0.25 gallon per minute.
- o No water rights exist for water wells in the permit and adjacent areas. One right for water from an underground mine is no longer active.

Response to Comment 724.500 Supplemental Information

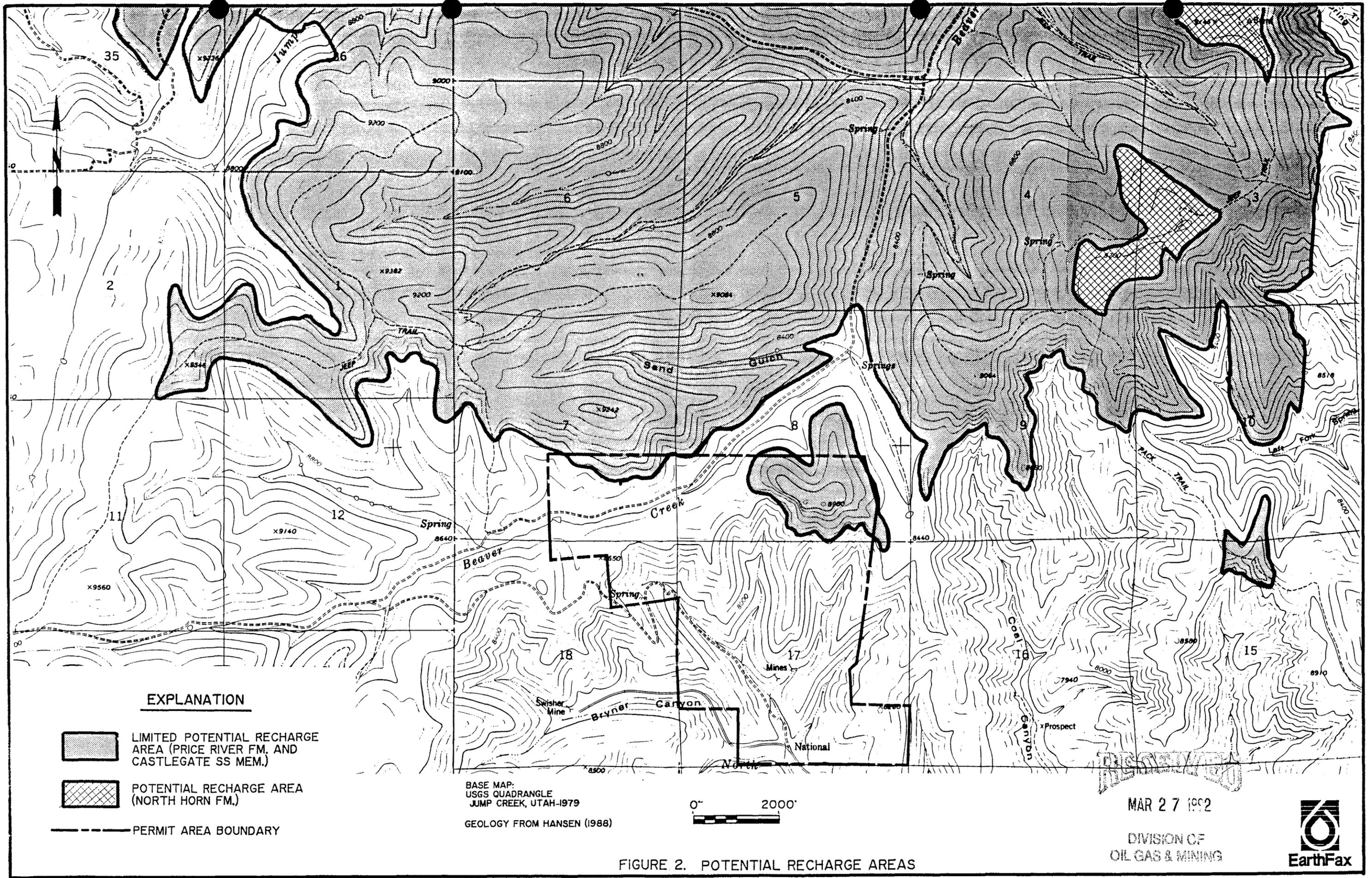
As noted by the Division, a discussion of recharge potential within the permit and adjacent areas was provided on pages 9 and 10 of the March 11 submittal. Figure 2 is presented herewith to supplement that information.

Figure 2 shows the locations of outcrops of formations above the Blackhawk Formation. Areas where the Price River Formation outcrops are identified as having a limited potential for recharge. This designation is based on the discussions on pages 2, 3, and 10 of the March 11 submittal. Note particularly the discussion on page 10 of the March 11 submittal which states that "in areas that are capped by the Price River Formation and the Blackhawk Formation (such as occur within the proposed permit and adjacent areas), Danielson et al. (1981) indicated that 'steep slopes promote rapid snowmelt runoff and **reduce recharge to the groundwater system**'. This condition is intensified by the relatively low permeability of the Price River and Blackhawk Formations. The limited amount of recharge in the area is reflected by the small number of springs as well as the dry conditions encountered by previous mine workings in the permit and adjacent areas and the LMC drill holes" (italics and bolding added).

Areas on Figure 2 identified as having a potential for recharge are overlain by the North Horn Formation. Of the total area covered by formations above the Blackhawk Formation on Figure 2, only 3 percent of the area is overlain by the North Horn Formation where the potential for recharge is considered to be greater than "limited". It should be noted that no areas south of the proposed permit area and within the same 7.5 minute Jump Creek Quadrangle are overlain by formations above the Blackhawk Formation.

Response to Comment 728 Probable Hydrologic Consequences (PHC) Determination

The Division recommends that seasonal baseline groundwater data (quantity and quality) be provided and that Mr. Harvey's observations be detailed. Regarding the seasonal baseline groundwater data, it is our belief that sufficient information has been previously submitted to the Division. As noted on page 6 of the March 11 submittal, "the long history of mining in the area and the periodic measurements from the [LMC] drill holes suggest that [the Castlegate A and Hiawatha] seams and [the immediately underlying and overlying] strata are not seasonally saturated." In addition, the permit application package contains the results of monthly groundwater quality samples collected from springs at Station Nos. 1, 2, and 4 during 1989, 1990, and 1991 for the periods when the stations were accessible (April or May through November or December of each year).



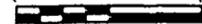
EXPLANATION

 LIMITED POTENTIAL RECHARGE AREA (PRICE RIVER FM. AND CASTLEGATE SS MEM.)

 POTENTIAL RECHARGE AREA (NORTH HORN FM.)

 PERMIT AREA BOUNDARY

BASE MAP:
USGS QUADRANGLE
JUMP CREEK, UTAH-1979
GEOLOGY FROM HANSEN (1988)

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FIGURE 2. POTENTIAL RECHARGE AREAS

A groundwater monitoring program was proposed in the first part of this letter to supplement the baseline information, particularly as it relates to the Hiawatha seam. However, the existing information is considered adequate to describe potential hydrologic impacts of mining in the Castlegate A seam. As noted in previous submittals, the probability of significant impacts occurring during mining of the Castlegate A seam is considered minimal.

A notarized letter discussing Mr. Harvey's observations is provided in Attachment A of this submittal. The following points are discussed in that letter:

- o Mr. Harvey was responsible for collecting and analyzing the drill-hole data to determine potential mining conditions at the property. An integral part of this assessment was groundwater conditions in the drill holes to assist in determining the potential for groundwater inflows to the mines. Mr. Harvey was on site and made observations during all drilling activities at LMC-1, LMC-2, LMC-3, and LMC-4.
- o Each hole was drilled using only air. One of the primary reasons for drilling with air was to allow observations to be made regarding groundwater occurrence. The holes were filled with drilling mud following drilling to aid in down-hole geophysical logging.
- o Each of the LMC holes was dry. This was verified both during drilling and during air injection following breaks in the drilling activities to determine whether or not water was accumulating in the holes.
- o Groundwater observations were an important part of Mr. Harvey's activities during drilling.
- o The holes were abandoned using a cement/bentonite mixture at the request of the U.S. Geological Survey. Holes were abandoned up to the depth where existing mine workings or fractures precluded pressurization of the holes.

The fractures and other large voids encountered in the drill holes (as evidenced by the ceasing of plugging operations) served to essentially enlarge the effective radius that the holes were monitoring with respect to groundwater. The fact that these holes remained dry in spite of these fractures or voids is further evidence of the dry nature of the subsurface formations in the area.

As a final note, the Division noted in the "Compliance" section of their comment "that the Gamma log data presented in the original submittal from Century Geophysical Corporation does not indicate a dry hole following drilling in drill hole LMC 1." As discussed in Mr. Harvey's letter, this fluid was drilling mud that was injected into the hole following drilling to aid in down-hole geophysical logging. No water or drilling muds were utilized during drilling.

Ms. Pamela Grubaugh-Littig
March 26, 1992
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We hope that this information satisfies your needs. Please contact us if you need additional information.

Sincerely,



Richard B. White, P.E.
Principal Hydrologist

Attachment

cc: Roger Skaggs

Literature Cited

Hansen, C.D. 1988. Geology of the Jump Creek 7.5 Minute Quadrangle, Carbon County, Utah. Masters Thesis, Geology Department. Brigham Young University. Provo, Utah.

Ms. Pamela Grubaugh-Littig
March 26, 1992
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ATTACHMENT A

Notarized Letter from Joseph A. Harvey
Concerning Drilling of the LMC Holes

March 24, 1992

Mr. Richard B. White, P.E.
Principal Hydrologist
EarthFax Engineering, Inc.
7324 South Union Park Avenue
Suite 100
Midvale, Utah 84047

Subject: Involvement during drilling and abandonment of
LMC drill holes

Dear Mr. White:

The following is provided pursuant to the request of the Utah Division of Oil, Gas & Mining for information regarding the drilling of the LMC drill holes in Sec. 7 and 17, T. 13 S., R. 8 E. The Division's request was made in a letter to Mr. William R. Skaggs of Blue Blaze Coal Company dated March 23, 1992.

My Responsibilities and Background

During the mid-1970s to early 1980s, I was under contract to C&W Coal Producers Corporation as a Mining Consultant. One of my primary responsibilities during this period was to supervise the drilling of four exploratory holes on the property (labeled LMC-1, LMC-2, LMC-3, and LMC-4). My responsibilities during drilling included examining the drill cuttings and assessing the potential for groundwater occurrence to assist me in drawing conclusions regarding probable conditions to be encountered during mining of the property. As such, I was interested in assessing roof and floor conditions, coal conditions, groundwater occurrence, potential splits in the coal seams, etc. Groundwater occurrence in the holes was of particular interest as part of my observations because of its potential influence on future mining conditions. Because of my need to obtain this information, I was on site and made observations during all drilling activities.

My responsibilities also included supervising hole abandonment activities. I was periodically on site during the abandonment activities.

Prior to my work as a Mining Consultant, I was employed by U.S. Steel from 1947 to 1974 at their Columbine and Geneva Mines near East Carbon, Utah. During this period, I held a variety of positions, serving for the last 16 years of my employ with U.S. Steel as superintendent of the Columbine and Geneva Mines. The superintendent position included responsibility for both surface and underground activities at the mines.

Mr. Richard B. White, P.E.
March 24, 1992
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Drilling Methods

Each of the LMC holes was drilled using air as the only drilling fluid. No water or drilling mud was injected into the holes during drilling. The holes were all drilled using rotary drilling rigs. One of the primary reasons for remaining with air during drilling was to monitor the holes for the potential occurrence of groundwater. After each break in drilling activities (e.g., rig maintenance, beginning of a new day, etc.), compressed air was injected into each hole prior to the resumption of drilling to determine whether or not groundwater was accumulating in the hole.

Following drilling of each hole, mud was injected into the holes to facilitate down-hole geophysical logging. Again, it is emphasized that no mud or water was injected into the holes during drilling.

Occurrence of Groundwater in Drill Holes

No groundwater was encountered during drilling of any of the LMC holes. This conclusion is based on the following observations:

- o As noted above, each hole was drilled using only air. No cuttings returning from the holes were saturated. In addition, no water was observed blowing from the LMC holes during drilling.
- o Also as noted above, compressed air was injected into each hole following breaks in drilling. No water was returned from any of the LMC holes during this air injection.

It should be emphasized that the occurrence of groundwater in the holes was of major importance during drilling activities. Thus, the above observations were not made in passing, but were made with care.

Hole Abandonment

Following drilling, the U.S. Geological Survey required that the holes be abandoned. Abandonment was accomplished by introducing a cement/bentonite slurry through the drill rods using the drilling pump. The drill rods were placed on the bottom of each hole at the beginning of abandonment and gradually raised as the cement/bentonite slurry was introduced.

It was the initial intent of the abandonment procedure to cement the holes from the total depth to approximately the surface. However, fractures or previous mine workings were encountered in

Mr. Richard B. White, P.E.
March 24, 1992
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holes LMC-1, LMC-3, and LMC-4. These voids were sufficiently large to preclude plugging with the cement/bentonite mixtures. Thus, plugging ceased at these elevations. These three holes remained open above the point where cementing operations ceased.

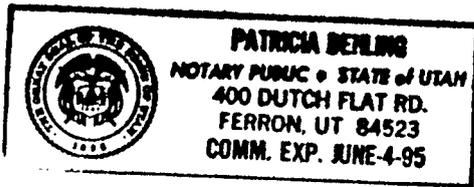
Please contact me if you have any additional questions.

Sincerely,



Joseph A. Harvey
Mining Consultant
500 Harvey Lane
Ferron, Utah 84523

On March 24, 1992 Joseph A. Harvey personally appeared before me and signed the above document.



Patricia Behling
Ferron, Emery Co, Utah