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**Date:** 10/25/2006 8:30:40 AM  
**Subject:** Bear Canyon Lease

Steve, these are the pages that contain text about surface and ground water sampling and water replacement. Could you please review them and let me know if this is adequate.

A discharge line was installed in 1991 to the approved discharge point located above the scale house (Plate 7-1C). A totalizing flow meter is installed to monitor flows. Flows are logged and reported to the Utah Division of Water Quality with the monthly Discharge Monitoring Reports (DMR). Copies of these reports will be included in the quarterly Water Monitoring Reports.

On March 30, 1989, the State of Utah, Department of Health, stated that "a permit is not required" for overflow from the Bear Canyon culinary system (Appendix 7-B). The culinary overflow is piped into culvert C-8U (Plate 7-1C).

Expected mine water is further discussed in the Probable Hydrologic Consequence Determination (PHC), Appendix 7-J. Currently, no water is discharged from the Tank Seam due to the lack of mine water inflow. Similar conditions are expected in both Seams within Wild Horse Ridge.

### **Site Selection**

C. W. Mining has selected sites that have been developed for beneficial use, are the primary source of surface water systems, or contain large flows, for monitoring. The parameters tested for and the schedule followed are the ones determined to be adequate based on the study found in Appendix 7J. Three years of baseline data will be collected which exceeds the minimum required by law. The Division recommend list for baseline parameters will be followed which exceeds the minimum required by law. Additionally every five years baseline parameters will be collected. The rest of the time filed readings will be collected which includes flow data and enough parameters to determine an impact.

## Effects of Mining on Surface Water

The operation of Bear Canyon Mine by C. W. Mining is expected to have only a very minimal effect on surface water on the area. The quality of Bear Creek before passing through the mine plan area is poor. Generally, as the excess mine water is discharged into Bear Creek; the surface water quality is improved significantly after passing through the mine site. The potential impacts to surface waters are discussed in [Appendix 7-J, section 9.1.2](#). The greatest potential impact of mining operations is probably an increase in sediment loading to Bear Creek. Controls and diversion structures have been constructed to prevent sediment-laden water from disturbed area from mixing with local surface water, to minimize the mining impacts on the receiving stream waters.

### Site Selection

All perennial streams inside the permit area start within the permit area. Because of this the major groundwater sources feeding them are monitored. Surface monitoring sites have been selected at all major confluences and at other points of interest. Additionally sites were selected in all perennial streams as close as possible, based on accessibility, to the edge of the permit boundary to detect any of site impacts. The parameters tested for and the schedule followed are the ones determined to be adequate based on the study found in Appendix 7J. Three years of baseline data will be collected which exceeds the minimum required by law. The Division recommend list for baseline parameters will be followed which exceeds the minimum required by law. Additionally every five years baseline parameters will be collected. The rest of the time filed readings will be collected which includes flow data and enough parameters to determine an impact.

### **724.300 Geologic Information**

Geologic information for use in determining the probable hydrologic consequence of mining operations upon the quality and quantity of surface and ground water, whether reclamation can be accomplished, and whether the proposed operations have been designed to prevent material damage to the hydrologic balance outside the permit area is discussed in detail in [Chapter 6 Geology \(R645-301-624\)](#) and under numerous headings in this chapter.

Additional Monitor Wells. A minimum of one additional drillhole will be installed in the northern portion of the Wild Horse Ridge area, shown as DH-5 on Plate 5-1C. If necessary, additional wells may be installed following the installation and evaluation of DH-5 in order to adequately characterize the groundwater aquifers of the lower Blackhawk and upper Star point formations. DH-5 and any additional drillholes will be tested using the same methodology, which was used in the previous in-mine wells, described in Appendix 7-N. The holes will then be completed as monitor wells in the same manner as described in Appendix 7-N.

Springs above the mine have also been selected based on the conclusion of Appendix 7J and 2006 field investigations that included regulating agencies and interested parties. Because these springs are above the coal seam water quality impacts are not a major concern, however flow quantity impacts are. Sites were selected because they were either major contributors to surface water systems, or they were springs that have been developed for beneficial use or have water rights on them. The major contributors to surface water systems are SMH-3, SMH-4, SBC-12, SBC-18, SBC-20, SBC-21, SCC-1, SCC-3, and SCC-5. Perennial portions of the streams feed by sites SCC-5, SCC-2, SBC-20, and SBC-21 will be undermined. Because of this these sites will be monitored for flow weekly starting one month prior to undermining and continuing until one month after undermining at which time they will be monitored monthly for six months before returning back to their normal monitoring schedule. The ground water sites selected because they were developed or had water rights are SMH-1, SMH-2, SMH-5, SBC-15, SBC-16, SBC-16A, SBC-16B, and SBC-22.

Measuring the flow from springs and seeps is almost always difficult because flows tend to be dispersed and rarely concentrate into well-defined channels amenable to discharge measurement.

The most accurate method of measuring small discharges, and the method that will be used, is by observing the time required to fill a container of known capacity, or the time required to partly fill a calibrated container. The basic equipment is a stopwatch and a calibrated container.

Purchased pre-calibrated containers may be used or containers will be calibrated by either adding known volumes of water by increments and measuring the depth of water in the container, or by weighing the container with varying amounts of water in it, noting the depth in the container, and using the formula:  $V = (W2 - W1) / w$ ; where: V = volume of water in the container, W2 = weight of container with water, W1 = weight of empty container, and w = unit weight of water.

The basic field procedure will consist of interrupting the flow and collecting the water. Temporary earth dams may be constructed to divert the water through a small diameter pipe for capture. Or it may be possible to place a trough or half of a stove pipe against the spring or seep to carry the water to the calibrated container. Cloths, clay, or other materials will be used to temporarily seal cracks and force the water to go into the calibrated container. Where flows come out of the ground in a number of distinct sources or if they are scattered over a broad area, the results of several different measurements will be added together.

Flows will be determined by direct measurement (depth times width times 2/3 velocity), by use of portable or stationary weirs or flumes, or, whenever feasible, by timed filling of a unit volume container. Measurements will be taken by qualified personnel following standard procedures with calibrated instruments.

Stream monitoring sites were selected based on the conclusion of Appendix 7J and 2006 field investigations that included regulating agencies and interested parties.

Annual Report. An Annual Report evaluating all data collected for the year will be submitted to DOGM as required.

Quarterly Data Submission. All water monitoring data will be submitted to DOGM on a quarterly basis within 30 days following the end of the quarter.

Discharge Permit and Reporting. All discharge report forms filed to meet Government requirements will be submitted to DOGM in the quarterly Water Monitoring Report. A copy of the mine discharge permit is included in [Appendix 7-B](#).

Post-Mining Portal Discharge. No gravity discharges are expected from the Bear Canyon No. 3 or No. 4 mines during or following reclamation. Any post-mining portal discharge that occurs will be monitored quarterly for operational parameters shown on Table 7-16. No water will be discharged into the mine during or following reclamation.

Undermining of Perennial Streams. There are two areas where perennial streams will be undermined. They are the upper reaches of the right fork and left fork of Fish Creek.

The left fork is fed by one watershed and several springs. FC-7 and FC-6 are surface monitoring sites in this watershed, however flow has only been observed at these points during major storm events and spring run-off. Most of the year the streams above the confluence of the major springs feeding it. These springs are SBC-18, SBC-20, and SBC-21, with SBC-21 being the largest. The confluence of these springs with the main stream channel is inaccessible.

The right fork of Fish creek has two splits and is fed by three watersheds. The left split of the stream channel has base flow fed by SCC-5. This point also marks the start of the perennial section. The center split base flow is fed by SCC-2 which also marks the start of the perennial section for the center split. The right split is dry except during spring run-off or large storm events. However during wet years water may flow from site FC-5 (Mudd Spring). Because of this FC-5 was selected as the start of the perennial section of the right split. Monitoring site FC-4 was selected because it is the confluence of the three splits. Site FC-3 marks the property line between private and federal property, and site FC-2 was selected to monitoring off site impacts.

In these areas C. W. Mining will increase the monitoring of these sites to a weekly bases one month prior to mining in the area. This weekly monitoring will continue until one month after mining has left the area. Monitoring will then be reduced to once a month for an additional 6 months at which time it will resume its normal schedule. This increased monitoring will include the sites FC-2, FC-3, FC-4, FC-5, and SCC-2 for the right fork of Fish Creek, and FC-1, FC-6, SBC-18, SBC-20, and SBC-21 for the left fork of Fish Creek.

## **731.800 Water Rights and Replacement**

If a state appropriated water supply is impacted by mining and/or mining related activities, C. W. Mining will replace it as required under R645-301-731.530 of the Utah State Code. Also in accordance with federal lease stipulation 21, if any water resource that has been identified for protection is impacted, C. W. Mining will replace the water resource. State appropriated water rights with points of diversions within the permit area are shown on Plate 7-12. All water resources identified for protection by the U. S. Forest Service are shown on Figure 5C-3. All water resources identified for monitoring are shown on Plate 7-4. These sites were identified in 2006 during several field surveys that included representatives from the following agencies at one or more of the surveys.

C. W. Mining Company  
Utah Division of Oil Gas and Mining  
State of Utah Water Rights Division  
United States Forest Service  
United States Department of the Interior - Bureau of Land Management  
United States Department of the Interior - Office of Surface Mining  
C. O. P. Coal Development Company  
ANR Inc.  
Huntington Cleveland Irrigation Company  
Huntington Cattle Association

The primary water rights owners that may be impacted are C. O. P Coal Development, ANR Inc., United States Forest Service, and Huntington Cleveland Irrigation Company. Following is a discussion of the water usage of the entities and probable water replacement methods.

### **C. O. P. Coal Development**

C.O.P Coal Development is the land owner and federal lease holder of all land being mined by C. W. Mining Company. They are a controlling entity of C. W. Mining in is much as they can dictate mining areas and methods through their lease requirements. Their water rights include stock watering, residential, and industrial. Stock water rights are associated with springs located above the

mine within the subsidence area. These lands and water are leased to cattlemen who use the water for stock watering. The springs they use for residential use are located outside of the permit area near the old Trail Canyon Mine and inside the Bear Canyon #1 Mine. No impact is expected to these springs based on the investigation included in appendix 7J. These springs also provide the industrial water used for the mining operations conducted by C. W. Mining Company.

C. W. Mining has agreed to work with C. O. P Development on the replacement of any water rights.

### **ANR Inc.**

ANR is affiliated with C. W. Mining in that they are both controlling entities of Hiawatha Coal Company. ANR Inc. is the private land owner and the federal lease holder for all lands mined by Hiawatha Coal. C. W. Mining is the LMU holder for all federal leases held by ANR Inc. Their water rights include stock watering, municipal, industrial, irrigation and residential. The only water rights located within the affected area are the ones used for stock watering. They also lease land and water to cattlemen.

C. W. Mining has agreed to work with ANR Inc. on the replacement of any water rights.

### **United States Forest Service**

The U. S. Forest Service owns stock watering rights above the subsidence area. These water rights are used by wildlife and cattlemen who are leasing the land and water from the Forest Service.

Because of the nature of their use if these water rights were impacted the Forest Service would need the water to be restored to the original location. If the impact was a cracked stream or pond C. W. Mining would use pond liners, grouting, or other technologies available to repair the

cracks. If the impact was a displaced spring C. W. Mining would install guzzlers, wells or other available technology to restore the water. Based on the experiences of other mines these methods have been acceptable.

### **Huntington Cleveland Irrigation Company**

Huntington Cleveland Irrigation Company (HCIC) has water rights for stock watering, irrigation, and municipal uses. For stock watering and irrigation HCIC does not hold any water rights within the subsidence area. HCIC's points of diversion for their state appropriated water rights are located downstream of the subsidence area. Because of this, the stock-watering and irrigation uses for HCIC may not require replacement right at the source. They do require that the same quantity of water flows downstream to their points of diversion. For municipal use they have two springs of concern located outside, but near the permit area. These are Birch spring and Big Bear Spring. These springs are discussed in depth in Appendix 7J on pages 116 through 126. If these springs were impacted HCIC would require the same quantity of flow at a quality that meets drinking water standards.

If stock watering or irrigation water were impacted C. W. Mining would transfer or retire enough of their shares in HCIC to cover the lost water, or any course of action agreed upon between C. W. Mining and HCIC. Based on the study included in Appendix 7J showing that the springs are recharged locally, no impact to Birch Spring and Big Bear Spring is expected. However members of HCIC have expressed concern that the faults C. W. Mining will mine up against maybe recharge areas for these springs. In the extremely unlikely event that one of these springs is impacted, C. W. Mining would replace the lost flow with equivalent flow from existing springs which it currently holds water rights on. The replacement of either of the springs would most likely be development of new sources that meet the required standards, or the transfer of water from a source, that meets the standards, owned by C. W. Mining to the culinary water system impacted. Details regarding the replacement would be

negotiated with HCIC and the municipalities impacted.

The requirement to replace water would be contingent upon the finding from Utah Division of Oil Gas and Mining that a state appropriated water supply or protected water resource was contaminated, diminished, or interruption by underground coal mining and reclamation activities conducted after October 24, 1991.