0009

Mine Site
ACT/007/006
Folder #7

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

June 1, 1998

To: File

Thru: Daron Haddock, Permit Supervisor DRH

From: Sharon Falvey, Senior Reclamation Specialist SKF

RE: Birch Spring Findings for Technical Directive 005, Cyprus Plateau Mining Corporation, ACT/007/006, Carbon County, Utah, and Co-Op Mining Corporation, ACT/015/021, Emery County, Utah, Folder #7

SYNOPSIS

Technical Directive 005 provides a process for the Division to review water quality data, identify implied water resource issues, and evaluate alleged problems. A September 17, 1997 memo initiated the directive process and identified the reduced flow rates recorded at Birch Spring. The Division compiled an analysis, regarding the observed changes in flow rates at Birch Spring, and requested Cyprus Plateau Mining Corporation (Cyprus Plateau) and Co-Op Mining Corporation (Co-Op) to provide comments. Response letters from Co-Op (April 13, 1998) and Cyprus Plateau (April 25, 1998) were submitted to the Division. Clarification and discussion were provided from Co-Op, while Cyprus Plateau requested they be removed from the directive process.

This memo provides the findings made from information provided in the plans, hearings, supporting documents, memos, and letters. Those findings are: 1) the Star Point Mine mining activities are not likely to have affected the flows at Birch Spring, 2) the cause for decreased flow at Birch Spring cannot be determined, and, 3) Co-Op is requested to develop an action plan which will increase understanding Birch Spring hydro geology.

ANALYSIS

Star Point Mining Activity

The Cyprus Plateau Star Point Mine and their mining activities are not a probable cause for decreased flows at the Birch Spring. The following items support this determination:

1) It is unlikely that decreases in Birch Spring flow would be noted from mine dewatering at the Star Point Mine within the reduced flows period. Flows declined at Birch Spring around 1990, prior to 1992 when mine dewatering began under the Gentry Ridge. Dewatering ceased in 1995 and Birch Spring flow reached a record low in May 1997.

2) The Birch Spring and Star Point Mine water are believed to originate from different sources as is suggested by the deuterium and oxygen ratios. Water at the Star Point Mine plot on or above the Meteoric Water Line while Birch Spring water plot below the Meteoric Water Line.

3) The rate water flows from the recharge sources to the spring through the formations is slow. Water dating conducted suggest modern water (younger than 50 years) is not contained in Birch Spring. Conclusions from carbon 14 dating techniques determined Birch Spring water has 1,100 to 1,900 years mean residence time.

Cause for Decreased Flow at Birch Spring

The cause for decreased flow at Birch Spring can not be determined from the information currently available, nor can it be determined that mining at the Bear Canyon Mine has affected flows at Birch Spring; however, existing information does suggest that flow intercepted in the Bear Canyon Mine is hydrologically disconnected from Birch Spring. Under Docket No. 95-025 Cause No. ACT/015/025, *In the Matter of the Five Year Permit Renewal, Co-Op Mining Company, Bear Canyon Mine, Emery County, Utah* the Board found that Co-Op's mining in the Blind Canyon Seam is not linked to declines in spring flow from Birch Spring. The Board determined the evidence linking the declines in flow at the spring to mining activities rather than the drought was not convincing.

Flow at Birch Spring has declined from 33 gpm in February 1990 to about 19 gpm in 1997, with a 16 gpm low flow recorded May 1997. This decline in flow could result from the drought beginning in 1987 through early 1993. It should be noted that flow data at Birch Spring were collected by the USGS in 1978 and 1979 during a drought period when flow rates from 9.3 gpm to a 23 gpm were recorded.

Additional data, not presented in the Board Hearing, was contained in the Star Point Mine Plan. This data suggests a larger decrease in flow occurred at Birch Spring following the observed peak flows in 1988 through 1991. These peak flows occurred during the same period that the Tie Fork Well flow increased resulting from the earthquake occurring on August 14, 1988. The earthquake may have caused these peak flows at Birch Spring but, the water that reached the spring is not believed to originate from the channel sandstone which provides the normal flows and discharge characteristics at Birch Spring.

Data supplied by the Star Point Mine were obtained from an individual who had measured the flows for the North Emery Water Users Association (NEWUA). This individual passed away and his records are not available through NEWUA. Available NEWUA data are not the same as the Cyprus data and can not be verified.

Future increases in flow should verify whether the drought caused the reduced flows assuming a wet climatic cycle continues and other factors remain equal. Reduction in flows may suggest dewatering from the Bear Canyon Mine, or the earthquake did affect the spring flow. Assuming the drought was the driving factor for change at the spring, it took approximately three years for the drought (beginning in 1987) to affect the spring. An increase in flow would probably take a similar amount of time to respond to increased precipitation or; the response time could take longer depending on recharge capability.

Investigations are needed to fully understand the hydrogeology at Birch Spring and to determine the reason for decreased flows. The water users participation is required to resolve issues which concern them. The investigations which may increase the hydrogeologic understanding at the Birch Spring include:

- Determining areas where all parties are in agreement. The water users, Co-Op, and other interested parties should resolve existing discrepancies or misunderstandings in data or other information where possible.

- Conducting an on-site visit to Birch Spring with the water users, Co-Op, and DOGM to determine the present condition of Birch Spring. Reviewing the Birch Spring development and maintenance history. (A group meeting prior to the site visit would be helpful).

- Investigating faults, fractures, and joints, starting with accurate and detailed mapping. Orientation, aerial extent, and associated lithologies should be identified.

- Identifying recharge areas and flow paths to Birch Spring.

- Determining mean residence time or "age" for ground and surface waters not previously dated. Conducting tracer tests, and modeling water chemistry evolution and reviewing water quality data for variations between pre-"peak flow", "peak flow", and post-"peak flow" periods should be conducted.

FINDINGS:

1) The Star Point Mine mining activities are not likely to have affected the flows at Birch Spring, 2) evidence linking decreased flows at Birch Spring to Co-Op mining activities was determined unconvincing; however, the cause for decreased flow at Birch Spring cannot be concluded using the available information, and 3) Co-Op is requested to develop an action plan to increase understanding the Birch Spring hydrogeology.

CONCLUSION:

According to Directive 005, if no explanation is acceptable to all parties under step 3F, development of an action plan will be recommended in the form of a Division Order. The Star Point Mine is not likely to effect Birch Spring and does not need to participate in actions under this Directive. Co-Op is requested to develop an action plan. Co-Op has verbally indicated they would voluntarily cooperate. Because this is the first time the procedure under directive 005 has been enacted, section 3F was re-written to account for the cooperative agreement from the Permittee. Changes to the directive are currently under review by committee. The Division is proceeding as if this review is approved.

RECOMMENDATION:

Co-Op is hereby requested to provide an action plan under step G. The action plan does not preclude involvement by the parties of interest. The action plan will be submitted to the Division within 30 days following receipt of this findings document.

sd
cc: Mary Ann Wright
North Emery Water Users
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