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BEFORE THE DIVISION OF OIL, GAS AND MINING
DEPARTMENT OF NATURAL RESOURCES
STATE OF UTAH

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IN THE MATTER OF THE FIVE-YEAR PERMIT RENEWAL, CO-OP MINING COMPANY, BEAR CANYON MINE, EMERY COUNTY, UTAH.	:	DIVISION FINDINGS, CONCLUSIONS AND ORDER
	:	DOCKET NO. 95-025
	:	CAUSE NO. ACT/015/025

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NATURE OF THE CASE

On October 12, 1995, the Castle Valley Special Service District, the North Emery Water Users Association and the Huntington-Cleveland Irrigation Company (collectively, the "Water Users") filed a Joint Objection to Renewal, Appeal, and Request for Hearing (the "Objection") with regard to the impending renewal of coal permit held by C.W. Mining Company, dba Co-Op Mining Company ("Co-op") for its Bear Canyon Mine. The renewal was granted by the Division of Oil, Gas and Mining (the "Division") on November 2, 1995. The Water Users appealed the Division's decision to the Board of Oil, Gas and Mining (the "Board"). This matter is now before the Division on remand from the Board pursuant to the Board's Order Granting Temporary Relief and Remanding for an Informal Conference, dated February 23, 1996 (the "Order").

The Division convened this Informal Conference on October 17, 1996, and it was continued through November 8, 1996 to February 28, 1997. Appearances for the parties were as follows:

For the Division:	James W. Carter, Director
For the Water Users:	Jeffrey W. Appel, Appel & Warlaumont J. Craig Smith, Nielsen & Senior
For Co-op:	F. Mark Hansen Carl E. Kingston

ISSUES RAISED

The question at hand is whether Co-op is entitled to renewal of its Bear Canyon Mine permit pursuant to the permit renewal provisions of the Utah coal regulatory program. Those requirements are found at R645-303-230, et. seq. The criteria for approval, set forth at R645-303-233.100 require the Division to approve permit renewal unless the Division makes one or more of the findings set forth there. The Water Users allege that Co-op is not entitled to renewal because two of the factors which would prevent renewal are present, 1) that the terms and conditions of the existing permit are not being satisfactorily met and, 2) that the present coal mining and reclamation operations are not in compliance with the environmental protection standards of the state program. The specifics of Water Users' allegations are set forth in their Joint Post-Informal Conference Memorandum and Closing Argument as follows:

1. The hydrologic information upon which the permit was originally issued is erroneous, and that the underlying permit is therefore defective and should not be renewed.

2. The mining activities are intercepting and re-diverting water that would otherwise provide flow to the Water Users' springs and are therefore not in compliance with the environmental protection standards of the Utah regulatory program.

3. The Probable Hydrologic Consequences document (the "PHC") makes false and inaccurate statements and lacks adequate baseline information to support the permit.

4. The Cumulative Hydrologic Impact Assessment document (the "CHIA") fails to adequately address the cumulative hydrologic impacts of mining because it does not include an assessment of the impacts of mining on water availability in the downstream service areas of the Water Users.

5. The CHIA is insufficient to determine whether the proposed operations have been designed to prevent material damage to the hydrologic balance outside the permit area.

6. Material damage to the hydrologic balance outside the permit area is occurring.

7. Mining operations at the Bear canyon mine have contaminated, diminished and/or interrupted state-appropriated water owned by the Water Users, entitling them to replacement.

Co-op's arguments are as follows:

1. The claims and assertions made by the Water Users in this proceeding are barred by the doctrine of collateral estoppel and the decision of the Utah Supreme Court in

Castle Valley Special Service District, et al v. Utah Board of Oil, Gas and Mining, et al filed on December 31, 1996.

2. The Water Users have not met the burden of proof to overcome Co-op's entitlement to permit renewal as set forth in R645-303-230 and UCA Sec. 40-10-9(4)(a).

3. That Co-op's permit and operations are in compliance with the requirements of the Utah coal regulatory program.

Based upon the evidence in the Division's files, the record of this Informal Conference and the testimony and argument received, the Division makes the following Findings of Fact, Conclusions of Law and Order:

BACKGROUND FINDINGS OF FACT

1. The core of this dispute is whether coal mining in the Tank and/or Blind Canyon Seams is adversely affecting, or will adversely affect, springs in the area which constitute major water supplies for the Water Users. The Division issued a permit to Co-op for the Bear Canyon Mine on October 30, 1985, which permit was renewed on May 20, 1991. Mining began in the Blind Canyon Seam. Before December of 1989, no significant water was encountered in or discharged from the Bear Canyon Mine. Water inflow was small and often insufficient to meet the operational needs of the mine. In 1991 Co-op first began discharging approximately 60 gallons per minute from the mine.

2. In 1993, Co-op applied for a permit revision to allow mining of the Tank Seam at the Bear Canyon Mine, which seam is located topographically and geologically above the Blind Canyon Seam. The application included Appendix J-7, "Probable Hydrologic Consequences of Mining at Bear Canyon Mine, Emery County, Utah," and Appendix 7-N, "Revised Hydrogeologic Evaluation of the Bear Canyon Mine Permit and Proposed Expansion Areas." The Water Users objected to the permit revision, and on December 9, 1993 the Division conducted an informal conference on the objection. On July 20, 1994 the Division issued a Technical Analysis which incorporated the finding in the Division's revised Cumulative Hydrologic Impact Assessment ("CHIA") for the Gentry Mountain area that:

> "The review of water source information, the graphical tracking of precipitation versus flow, the testing of the spring water and mine water quality for tritium dating, analysis of water quality chemical data using Stiff and Piper diagrams, and the known presence of three separate piezometric surfaces ... leads to a conclusion of no significant material damage to the Hydrologic Balance outside the permit area."

The Division then approved Co-op's permit revision.

3. The Water Users appealed the approved revision to the Board, which held a formal evidentiary hearing. The Water Users presented evidence and argued that mining of the Tank Seam would adversely affect the springs because the permit area and springs were within the same regional aquifer and were in hydrologic connection, and that Co-op's mining operation had intercepted the aquifer which supplied the springs. Co-op presented evidence to support its claim that mining the Tank seam would not adversely affect the springs because the permit area is hydrologically isolated from the aquifer feeding the springs.

4. On June 13, 1995, the Board affirmed the Division approval of the permit revision and rejected the Water Users' arguments, finding that the mined areas were hydrologically separate from the Water Users' springs and that the mining was not adversely affecting the springs. The Water Users appealed to the Utah Supreme Court, which in a December 31, 1996 Opinion affirmed the Board's Order.

5. On June 16, 1995, Co-op filed a permit renewal application for the Bear Canyon Mine. On October 12, 1995, the Water Users filed Objections to Permit Renewal and Request for Informal Conference. The Objections asserted that continued mining in the Tank and Blind canyon seams would adversely affect the Water User's springs. On November 2, 1995, the Division approved the permit renewal application, which approval was appealed to the Board. On February 23, 1996, the Board reversed the Division's renewal of the permit, and remanded the Water Users' Objections to the Division to conduct the requested Informal Conference. Co-op appeared during the Board's review of the Water Users' Objections and argued that the matter had been resolved by the previous proceedings and was therefore res judicata.

6. On remand, the Division convened this Informal Conference, directing that the parties introduce all new information and analyses of existing information which would provide a basis for revising or reversing the findings and conclusions the Division had made in support its June 20, 1994 determination that the mining was causing no material damage to the hydrologic balance outside the permit area. In addition, the Division solicited argument and evidence from the parties on the Water Users' assertion that the recently passed water replacement requirements of Utah Code Section 40-10-18(15) applied and that the Division should find that state appropriated water owned by the Water Users was being contaminated, diminished or interrupted.

GEOLOGIC AND HYDROLOGIC FINDINGS OF FACT

7. The Water Users argue that the water issuing from their springs passes through the area being mined on its way to the springs and is adversely affected by the mining activity, and that the mining has upset the recharge system which historically supplied their springs. Co-op argues, and the Board and Division have previously found, that the area which is being mined is effectively hydro logically isolated from the Water Users' springs.

8. Co-op has mined the Tank, Blind Canyon and Hiawatha seams, all located in the Blackhawk formation, which extends laterally to the north and south of the permit area. The Blackhawk formation lies conformably on the Star Point formation, which also extends outside the permit area. The Star Point formation contains three sandstone layers -- the Spring Canyon, Storrs and Panther members from top to bottom -- which are separated by layers of Mancos shale 50 to 80 feet thick. The Mancos shale layers are understood to be laterally continuous within the permit area. The Blackhawk formation also contains many layers of shale as well as the coal seams. The strata in the permit and adjacent areas dip to the south at approximately five degrees. The Water Users' springs issue from the sandstone members of the Star point formation, both topographically and geologically below the coal seams being mined in the Blackhawk formation, and to the south, downdip from the mined area. The parties agree that recharge of the groundwater found in the permit and adjacent areas is from the surface of the land and is generally moving from north to south, downdip.

9. Some USGS studies have assumed that a single "regional aquifer" exists in the permit and adjacent areas. This assumption was not based on site-specific information, and is incorrect, at least in and around Co-op's permit area. The hydraulic conductivity of the Mancos shale layers in the mine area is calculated at 10^{-11} to 10^{-12} cm/sec., a million times less than the sandstone layers, and 10,000 times lower than clay liners used in hazardous waste landfills. The Mancos shale layers therefore act as confining barriers for water in the Star Point formation, greatly inhibiting vertical movement of water between the sandstone layers. Each of the three sandstone layers of the Star Point Formation contains water and has a separate potentiometric surface, indicating three separate aquifers which are not hydro logically connected. In the mine area, the potentiometric surface for each aquifer is above the top of the sandstone member it is contained in, indicating that the aquifers are confined in the mine area. The uppermost aquifer is in the Spring Canyon sandstone, well below the Blind Canyon and Tank Seams where the coal is being mined. No water was encountered in test holes drilled through the Blind Canyon and Tank seams. Water was encountered when the test holes reached the Spring Canyon member of the Star Point formation, and the water level rose in the wellbores above the top of the sandstone layer.

10. The Water Users argue that the permit and adjacent areas are "shattered" by fracturing and faulting, which provides vertical conduits for water flow through the low-permeability shale and coal layers. Co-op's mining activity is bounded on the west by Blind Canyon Fault, and on the east by Bear Canyon fault. The Blind Canyon Fault is visibly dry, and is filled with gouge, which if exposed to water would either cement, chemically replace or wash away, further indicating the fault has always been dry. The Blind Canyon Fault is a barrier to water flow, not a conduit for water, and is not transmitting water. There is no water coming into the mine at the Bear Canyon fault. Although fractures are evident in the permit and adjacent areas, the shale units are plastic compared to the more brittle sandstones. Shale tends to deform under pressure to seal internal fractures. These factors, taken together with the containment of the water in the underlying sandstone and the primary impermeability of the shales, lead to the conclusion that the overall vertical permeability of the stratigraphic section in the permit and adjacent areas is orders of magnitude lower than

the horizontal permeability in the area. As a result, virtually all of the water in the Star Point sandstone flows horizontally, not vertically, until it reaches the surface. Likewise, the water in the overlying strata moves not downward, but laterally downdip (generally southward) to the outcrop, where it evaporates. Observations during the October 17, 1996 mine site visit confirmed the presence of moisture at the exposed sandstone faces, showing the water in the upper aquifers indeed flows not vertically, but horizontally until it discharges by seeping out and evaporating at the outcrop.

MINE WATER FINDINGS OF FACT

11. The Tank seam in the mine area has been completely dry throughout. The Blind Canyon seam was dry until December of 1989, when Co-op intercepted water at the north end of its permit area. The intercepted water is in the Blackhawk formation, not the underlying Star Point formation. Except for the north end of the permit area, what few fractures exist in the mine are dry and show no signs of water ever having moved through them. The water Co-op encountered in the Blind Canyon seam comes down from the mine roof, not up from the floor.

12. Co-op has not intercepted water in the mine from the Star Point aquifers. The water in the mine appears to come from a perched aquifer in a sandstone channel above the Blind Canyon seam. The channel enters the mine from the roof, not the floor. The channel does not interrupt or dip below the Blind Canyon seam, but does spill out in a "flood plain" lip over the top of the seam. As mining proceeded northward, the Blind Canyon seam was dry until the channel was encountered. The water Co-op first intercepted in late 1989 appears to have come from the channel's flood plain lip. Co-op did not mine into the channel itself until April of 1993.

13. Radioisotope dating establishes the channel water's age at about 1,500 years. Water in the Star Point aquifers beneath the permit area is about 950 years old, hundreds of years younger than the higher elevation channel water. Water on the west side of the Blind Canyon fault is roughly 5,500 years old, thousands of years older than the channel water. Tritium tests show that Big Bear spring water is modern age. Mixing of water of various ages can produce water which tests at an intermediate age. The age of Big Bear Spring water, however, suggests that either no older mine water is contributing to the flow of Big Bear Spring, or that any mine water flow is so small as to be undetectable. Chemical testing also shows that the water flowing from Birch Spring is dissimilar from mine water and is therefore not coming from or through the mining area.

14. Calculations using the age of the water encountered in the sandstone channel and intra-mine flow suggest the pre-mining rate of flow though the channel is on the order of 1.2 g.p.m., a minuscule flow rate considering the volume of water contained in the sandstone channel. Before mining, the water may have been discharging to a spring in the permit area, to a creek, or to evaporation at the outcrop. If the Water Users' springs were fed from the

sandstone channel, they would have dewatered the channel ages ago. The fact that the channel still contains a great deal of water indicates the channel is not the source of the springs' water.

SPRING QUALITY AND FLOW FINDINGS OF FACT

15. Big Bear Spring and Birch Spring both issue from joints in the base of the Panther member of the Star Point formation. Comparisons of spring flow and precipitation data show the flow at Big Bear Spring responds to precipitation. According to the Water Users' own data, Big Bear Spring's flow rate began declining as early as 1984, as did precipitation, five or more years before Co-op first began intercepting water in its mining operation. As the area has recovered from a ten-year drought, Big Bear Spring's flow rate has also recovered, from a low of 76 g.p.m. in mid-1995 to 148 g.p.m. in late 1996. Present flow rates are well within the range of the spring's flow rate data for 1978-79, before the local drought and before Co-op began mining.

16. Birch Spring is approximately 800 feet to the west of Co-op's permit area and is physically separated from the permit area by two major faults, including Blind Canyon fault, which acts as a barrier to water flow. Birch Spring flow is also precipitation-related. Its flow rate began to decline in mid-1988, about one and one-half years before Co-op first began intercepting water in the mine. Birch Spring's flow in recent years is near the upper range of the historical flow data for 1978-79.

17. Although Little Bear Spring has been found to not be useful as a control, the Water Users' data show Little Bear and Upper Tie Fork Springs declined in flow from the mid-to-late 1980's to the mid-1990's, and began increasing in flow in early 1995. This pattern is similar to that shown in the precipitation data, and the flow rates for Big Bear and Birch Springs as well as Huntington Creek. The spring hydrographs show that declines in flow at the springs were immediately preceded by sharp flow increases or "spikes" in mid-1988. At that time Co-op had not encountered or begun discharging water from the mine. The Water Users' expert testified the spikes were likely caused by an earthquake known to have occurred in the area just prior to the spikes and the subsequent decline in spring flow.

18. The Water Users allege that the springs have been, and will continue to be, contaminated by mining activities, pointing to events of anomalous flow and pollution in the springs. The Water Users argue that "the interconnection between Birch Spring and the mine was demonstrated by the spike flow out of the spring when the mine water was being discharged out of the portals." Even if the pumping caused the spike, which was not demonstrated, the pumping of water <u>out</u> of the mine into a surface drainage above Birch Spring does not demonstrate the hydrologic connection of water <u>in</u> the mine to Birch Spring absent pumping, an activity which is not now being performed and which is not allowed by the mine permit. Whether Co-op has, in the past, discharged water from the mine in violation of its permit is outside the scope of this proceeding.

19. Co-op's mining operations have been, and are now being, conducted to minimize disturbance to the hydrologic balance within the permit area and to prevent material damage to the hydrologic balance outside the permit area. Co-op's mining operations have not been shown to have caused contamination, diminution or interruption of Water Users' state-appropriated water.

THE PHC, THE CHIA AND THE PERMIT

20. The Water Users argue that the baseline data contained in Co-op's original permit application is erroneous, that Co-op's PHC contains false and inaccurate statements, that the CHIA is therefore also flawed, and that the CHIA fails to assess the impact of mining on water availability in the Water Users' service areas, thereby rendering the original permit flawed and incapable of being renewed. The baseline data, the PHC and the CHIA of which the Water Users complain were is existence at the time the permit was issued in 1985, at the time of the first permit renewal in 1991 and at the time of the Water Users' appeal of that renewal. The Water Users did not attack the adequacy of the permit baseline information, the PHC or the CHIA in their appeal of the 1991 permit renewal.

CONCLUSIONS OF LAW

1. Co-op's coal mining operations are in compliance with their permit and with the environmental protection standards of the state program.

ORDER

This informal conference is the second hard look the Division has taken at the allegations by the Water Users that Co-op's mining operations are adversely affecting their spring sources in the vicinity of the mine. Mining has progressed since the last hard look during the 1991 permit renewal and subsequent appeal. Additional information has been developed over the course of the mining in that time, which information has shed new light on the hydrology of the mine permit and surrounding areas. That new information is argued by the Water Users to demonstrate that the information the Division relied upon in making its permitting and renewal decisions was wrong, and that the permit is therefore flawed. The purpose of monitoring information is to test the assumptions and conclusions made at the time of permit issuance, and to decide whether mid-course adjustments in mining operations are necessary to keep the mine in compliance with its permit and the state regulatory program. While the PHC is the operator's best prediction of the "probable" hydrologic consequences based on a snapshot in time, the Division's CHIA is a dynamic document that accommodates new information and changes as our understanding increases.

The Water Users are convinced that mining activity so close to their water sources must be having an adverse effect on those sources, pointing to fluctuations in flow and water quality. In the same sense that everything in the universe is connected, the water in the hydrosphere is all part of a global system and the water in Huntington Canyon is all part of a

regional system. The Water Users have failed, however, to produce any evidence upon which the Division could make a finding that a causal relationship exists between Co-op's permitted mining activities and the injuries the Water Users allege. The Division believes that the new information and analyses made available through the efforts of both the Water Users and Co-op lends additional support to, rather than undermines, the Division's earlier conclusion that there is no effective hydrologic connection between the mine and the Water Users' springs, and that the mining activities are not causing material damage to the hydrologic balance outside the permit area. Co-op's mining permit is therefore renewed.

SO DETERMINED AND ORDERED this 11th day of August, 1997.

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING

James W. Carter, Director