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

Mine file

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June 6, 1997

Wendell Owen
Co-Op Mining Company
P.O. Box 1245
Huntington, UT 84528

Re: Federal Lease U-024316 Technical Analysis and Deficiencies, Co-Op Mining Company, Bear Canyon Mine, ACT/015/025-97-1, Folder #3, Emery County, Utah

Dear Mr. Owen:

The Division has completed a technical review of your application to permit Federal Lease U-024316 (Tank Seam). A Technical Analysis (TA) has been written and a copy is enclosed for your information and records. Please review it carefully. You will note that we have identified a number of deficiencies in your application. These will need to be corrected before we can approve the application.

In order for us to keep this project in the review loop, please provide your responses by no later than July 3, 1997. We look forward to working with you on completing this permitting action. Please call me or any of my technical staff if you have questions.

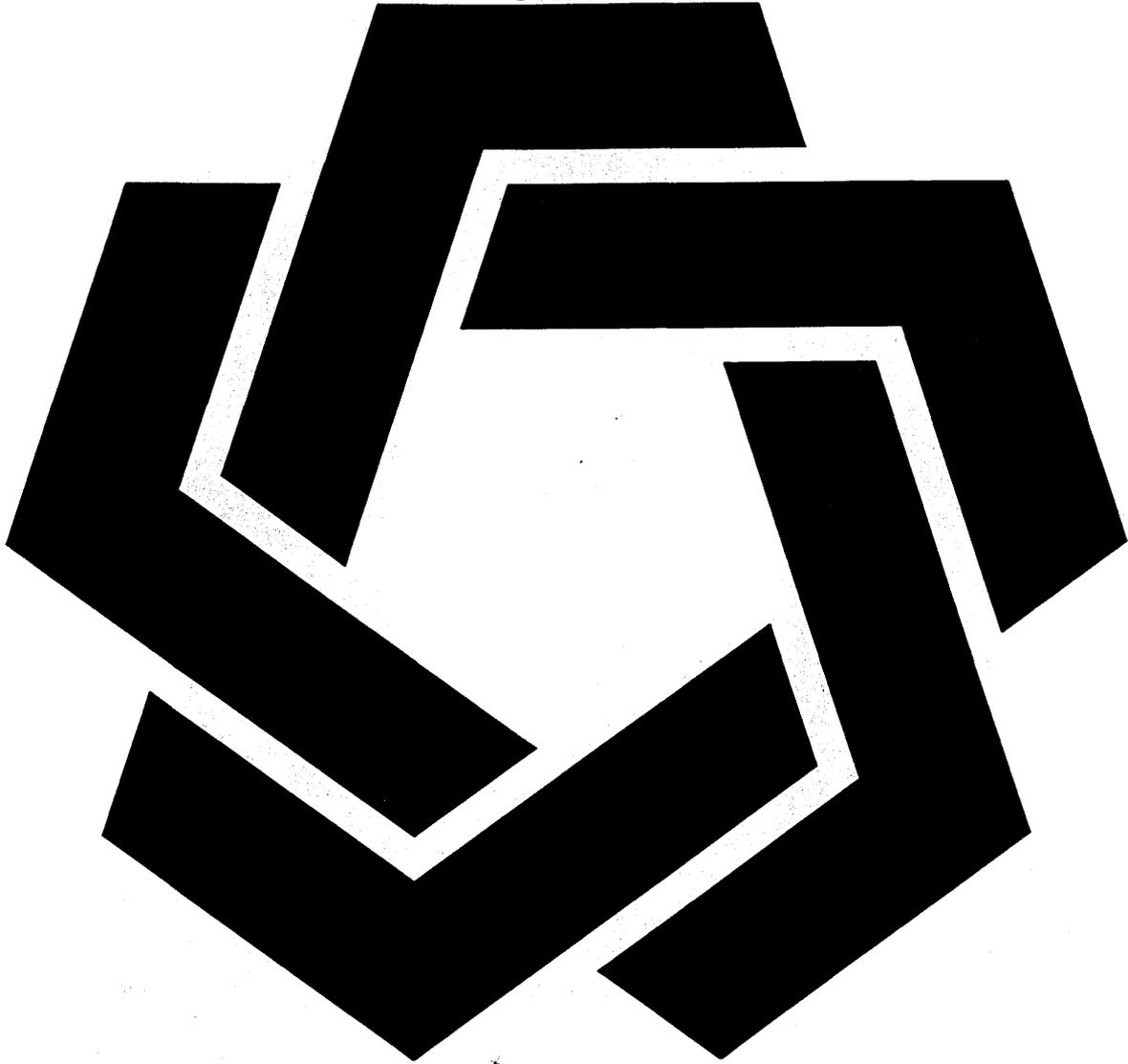
Sincerely,

Daron R. Haddock
Permit Supervisor

enclosure

cc: P. Grubaugh-Littig, w/o enclosure
Pete Hess, PFO, w/o enclosure
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State of Utah
Division of Oil, Gas and Mining
Utah Coal Regulatory Program



Technical Analysis and Findings
Federal Lease U-024316
Bear Canyon Mine
ACT/015/025
June 5, 1997

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TECHNICAL ANALYSIS

INTRODUCTION

This document provides the technical analysis for information submitted to expand the Bear Canyon Mine permit area to include federal lease U-024316. This information was submitted for Division approval on March 28, 1997. The main issues addressed in this submittal include changes to environmental resource information, changes to the PHC, and relative information provided to meet regulatory requirements for permitting the tank seam.

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 the 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 the 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.

SUMMARY OF OUTSTANDING DEFICIENCIES

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:

	Page
R645-301-525.150 , the permittee must correct the discrepancies in the calculated subsidence values which are found on page 3C-4.	21
R645-301-121.100 , the permittee must correct the statement which refers to the bald eagle as endangered. The bald eagle currently has threatened species status.	22
R645-301-121.200, -622, -624.100 , the permittee must correct statements in the text, such as those on pages 7-2 and 7-3, where it says the hydrologic evaluation of the Starpoint aquifers and information on faults and dip and their control on ground water can be found in appendix 7-H. The permittee must correct the statement on page 7-13: table 2-4 of appendix 7-J is not a generalized stratigraphic section of the geologic units. . .	11
R645-301-121.200, -622, -624, -724.300 , the permittee must retain the information included in Table 7.1-5 concerning twelve in-mine drill-holes, which has been removed in the proposed Tank Seam amendment. Eight apparently new in-mine drill holes have been added to Table 7.1-5; locations of five of the eight new drill-holes are on Plates 6-2 through 6-12, but locations of TS-12, TS-13, and TS-14 are not shown. Locations and	

TECHNICAL ANALYSIS

elevations, lithology and ground water information from these drill-holes should be provided in the MRP, including logs if they are available. 11

R645-301-333, the permittee must make a commitment, in the text of the permit, to provide the Division with current raptor monitoring information. 22

R645-301-624.200, -724.300, -725, the permittee must include information on drilling and completion of wells MW-116 and MW-117 and drill-holes SDH-1, SDH-2, and SDH-3; WHR-1, WHR-2, WHR-3, WHR-5, and WHR-8; and T-1, T-2, T-4, and T-5. Logs that show lithologic characteristics and location of ground water should be included in the MRP. Information on drill-holes should include location and elevation, physical properties and thickness of each stratum, depths, and drilling methods. In addition, information on wells should include construction materials, completion methods, and lithology or stratigraphy of the screened or open zone. This information should be available to the Division for use in preparing the Cumulative Hydrologic Impact Assessment (CHIA). 11

R645-301-711, the permittee must provide a clear statements of the past and present operations and historical flow patterns at the minesite. Beginning on page 1-8, the plan says that the Bear Canyon Mine will have no impact on the quantity of groundwater and the mine will not affect creek flow. The mine has an on going minewater discharge that has increased creek flows and has removed groundwater from its stored location. The statement that suspended sediments will be mitigated should be re-stated to be clear and accurate. A mitigation plan for suspended sediments was not found in the plan. 16

R645-301-720, the permittee must provide water monitoring sites on a map which depict the location of all previously monitored and existing monitoring sites. Plate-2 should also be updated according to the proposed monitoring site plan. 19

R645-301-722, the permittee must correct the statements made in section 7.1.2 to reflect information found elsewhere in the plan and to make the plan clear and concise. 8

R645-301-730, the permittee must provide the related potentiometric surface elevation discussions that incorporate information provided by stratigraphic logs and completion data for SDH-1, SDH-2, SDH-3 and the MW wells. 16

R645-301-742, the permittee must provide information relating the extent of the proposed mine workings for the Tank Seam to the uppermost potentiometric surface of the Blackhawk/Starpoint aquifer for incorporation into the plan. 16

ADMINISTRATIVE FINDINGS

IDENTIFICATION OF INTERESTS, VIOLATION INFORMATION, AND RIGHT OF ENTRY INFORMATION

Regulatory Reference: UCA R645-301-112; R645-301-113; R645-301-114

Analysis:

Identification of Interests

Interests of Co-Op Mining Company are identified in the Mining and Reclamation Plan already on file with the Division. Approval of this application will expand the permit area to include federal lease U-024316.

Violation Information

Compliance information is presented in Section 2.3. Neither the Applicant nor any affiliate, subsidiary or persons controlled by or under common control with the Applicant has had a federal or state mining permit suspended or revoked in the five years prior to the date of the application, and these entities have not forfeited a mining bond or similar security deposited in lieu of bond.

Right of Entry

Co-Op Mining company bases it's right to enter and conduct coal mining and reclamation operations on a lease from the federal government issued to C. O. P. Coal Development Company.

Section 2.2.2 has legal descriptions for fee surface and coal and for coal leases held by C.O.P. Coal Development Company.

Findings:

Information provided in the proposed application meets the minimum regulatory requirements of this section.

UNSUITABILITY CLAIMS

Regulatory Reference: UCA R645-301-115

Analysis:

To the best of the Applicant's knowledge, the permit area is not within and does not include any area designated or under current study for designation as unsuitable for mining. No operations are proposed within 300 feet of an occupied dwelling, or within 100 feet of a public road. The Division is not aware of any designation declaring this area unsuitable for mining.

Findings:

Information provided in the proposed application meet the minimum regulatory requirements of this section.

PERMIT TERM, INSURANCE, PROOF OF PUBLICATION, FACILITIES OR STRUCTURES USED IN COMMON, FILING FEE, NOTARIZED SIGNATURE

Regulatory Reference: UCA R645-301-116; R645-301-117; R645-301-118; R645-301-123

Analysis:

Permit Term

The application adds a federal lease to the existing permit for the Bear Canyon Mine. The revised permit term will coincide with the term of the current permit.

Insurance

A copy of the certificate of insurance is in the Division's files. No changes to the policy are needed as a result of the federal lease addition.

Proof of Publication

A copy of the proof of publication has not been included since the notice is still in the publication period. The affidavit of publication will need to be submitted as soon as it is available.

Facilities or Structures Used in Common

The federal lease addition will not change the surface facilities since this proposal extends the workings of an existing underground mine.

Filing Fee

No filing fee is required when adding a lease area to an existing permit.

Notarized Signature

The required notarized signature of a responsible Co-Op official was included in the transmittal which accompanied the permit application submittal. The information in the application was stated to be true and correct to the best of the official's belief and understanding.

Findings:

Information provided in the proposed application meets the minimum regulatory requirements of this section.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR Sec. 783., et. al.

GENERAL

Regulatory Reference: 30 CFR Sec. 783.12; R645-301-411, -301-521, -301-721.

Analysis:

As mining has progressed some of the general understanding of the environmental ground water resources have changed. Related changes in section 7.1.2 and 7.1.3 have been incorporated into this amendment. Major changes are identified and discussed below:

1. The plan previously stated that the potentiometric surface is considerably below the Star Point-Blackhawk contact in the area of the mine. Now the plan states that separate and distinct aquifers exist in the Spring Canyon, Storrs and Panther tongues of the Star Point Sandstone rather than one single aquifer within the Star Point/Blackhawk Formation. The separate formations are unsaturated in the southern portions of the permit area.

The separateness of the formations in the Star Point under the mine is plausible. However, the following statements are presented to lend caution to the amount of validity that can be placed on applying these statements to areas up gradient of the mined area.

- a. The wells were drilled following mining. Therefore, it is unknown what the water elevations in the formations were prior to mining. However, the outcrops of the formation may essentially function similar to a well drawing down the potentiometric surface to some distance up gradient of the outcrops.
- b. Lateral flow between the tongues of the formation is likely to be greater than vertical flow through the formation and could result in separate piezometric surfaces but, could still have a common hydrologic connection up gradient from the drilled wells.

The previous statement that the potentiometric surface is separate in the southern part of the permit area is not inaccurate but, does not definitively provide information on the potentiometric surface to the north of the minesite (See the findings section under Hydrologic Resource Information in this TA).

Because of unanswered questions about the potentiometric surface to the north of the mined area the Division believes the operator may be able to answer these questions through another series of in-mine drilling. Assuming the Tank Seam is above the potentiometric surface and would not effect this surface through the proposed mining, drilling downward to each of the potentiometric surfaces at the location furthest north in the proposed mine workings may provide information with

which greater confidence can be placed in determining the potentiometric surfaces to the north of the mined area.

2. Previously the permittee indicated that Bear Spring flow is derived from water bearing zones north of the mine site and includes water originating from the Star Point Blackhawk contact, cut by the fault to the north of the springs.

The permittee no-longer provides a statement in this section about the area that recharges Big Bear Spring. General recharge information is provided under section 7.1.33. Snowmelt at higher elevations provides the recharge for the ground water system and is controlled by; permeability of the strata; surface relief and, rate of snowmelt. The formation outcrops and alluvium are considered the principal recharge sources. Big Bear Spring is considered to have a component of modern water recharge as is suggested by tritium dating conducted on the spring.

3. Previously the permittee stated that Big Bear Spring fault and related sub-parallel fault zones are the primary control for a major amount of ground water occurring in the permit area. Now, the permittee states that the relative dryness of the faults and the existence of fault gouge in the mine indicate that little or no flow across these faults occur.

Clarification of this statement can be found on page 7-16 where the plan states "secondary permeability due to voids in joints or fractures, may occur in a near vertical direction." Additional information can be found in appendix 7-J pg. 2-7 in the plan. Groundwater has entered the mine through roof bolt holes and fractures. In appendix 7-J, page 2-13, the plan states that drainage of water from faults and fractures produces the largest volumes of water flowing into the mine. The description under section 7.1.4 suggests that flows exist which move downward through permeable strata, faults and joints and then move laterally until other permeable strata, faults and, joints allow vertical movement. In appendix 7-J, page 2-5, Big Bear and Birch Springs are stated to issue from fault and joint zones of the Panther Tongue of the Starpoint.

Other statements in the plan are found on page 7-5 and include the following:

- a. Joint systems at the surface are expected to be generally closed or possibly non-existent with depth,
 - b. Minor localized flow is expected to take place through the joint or fracture system with no affect on regional flow patterns and; outcrop examinations indicate that joint systems are not extensively interconnected.
4. Previously the permittee stated that secondary permeability is present along the near-vertical joints and bedding plains. Now, the permittee states that permeability is generally low with the exception of the Castlegate Sandstone.

The Castlegate Sandstone was indicated to have a porosity of 0.22. The statement on permeability and porosity is more descriptive for the Star Point formation in section 7.1.4. The peak

TECHNICAL ANALYSIS

flows and quick recharge of some springs supports the concept that recharge occurs through permeable fracture flows because the recharge occurred quickly in Big Bear Spring in 1996-1997.

Findings:

The permit does not meet the requirements of this section. The permittee must provide the following in accordance with:

R645-301-722, the permittee must correct the statements made in section 7.1.2 to reflect information found elsewhere in the plan and to make the plan clear and concise.

PERMIT AREA

Regulatory Requirements: 30 CFR Sec. 783.12; R645-301-521.

Analysis:

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. The additional area is shown on Plate 2-1--Permit Area. A formal description of the additional area is found on page 2-3 and is as follows:

Township 16 South, Range 7 East, Salt Lake Base & Meridian
Section 13: W $\frac{1}{4}$
Section 14: NE $\frac{1}{4}$

Findings:

Information provided in the proposed application meets the minimum regulatory requirements of this section.

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

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

Analysis:

No additional historic and archeological resource information was provided with the current lease application. No escarpment failure is expected with the current mining plan. If the mine proposes second

mining underneath the Castlegate escarpment an archeological and historic resources inventory will be required.

Findings:

Information provided in the proposed application meets the minimum regulatory requirements of this section.

VEGETATION RESOURCE INFORMATION

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

Analysis:

Plate 9-1, Vegetation Map was updated to include Federal Lease U-024316. The Riparian Community type along Bear Creek is shown to extended into the Federal Lease. No wetlands were delineated on the map.

Findings:

Information provided in the proposed application meets the requirements of this section.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.22; R645-301-623, -301-724.

Analysis:

The current MRP includes geologic information to assist in determining the probable hydrologic consequences of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas. The only change to the text in Chapter 6 - Geology in the proposed Tank Seam amendment is removal of the "Upper Beds" from the list of coal beds in Table 6-2 on page 6-17. What was previously referred to as the Bear Canyon coal seam is now referred to fairly consistently throughout the text and on maps as the Blind Canyon coal seam.

All plates for Chapter 6 have been updated with information from additional drill holes. But logs from drill-holes SDH-1, SDH-2, and SDH-3 are not in the current MRP nor in the proposed Tank Seam amendment. Logs showing the lithologic characteristics, including physical properties and thickness of each stratum, and location of ground water where occurring should be in the MRP.

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Figures 7.1-2 through 7.1-5 are being removed from the plan. The first three give generalized stratigraphic information and the fourth is detailed stratigraphic information based on interpretation of a geophysical well-log from bore-hole T-5. The reason for removing these four figures is not given and there are no equivalent plans or cross-sections submitted to replace them.

Water levels for Los Angeles Department of Water and Power (LADWP) wells MW-116 and MW-117 are discussed in the proposed Tank Seam amendment; however, there is no information on these wells other than their location, shown on Plate 7-4. The Tank Seam amendment should include information on drilling and completion of these two wells, such as: drilling methods, construction materials, completion methods, depths, and lithology or stratigraphy of the screened or open zone, so it can be evaluated as part of the Technical Assessment (TA) of the proposed Tank Seam amendment and used in preparing the Cumulative Hydrologic Impact Assessment (CHIA). If available, logs for these two wells that show lithologic characteristics and location of ground water should be in the MRP.

Information on twelve in-mine drill holes that was previously in Table 7.1-5 has been removed. Water quality data from at least one of those twelve holes, WM-C, is included in Table 7.1-1. Locations for the twelve drill-holes are not on either current or newly submitted maps. Locations and lithology and ground water information from these bore-holes should be in the MRP, including logs if they are available.

Information on eight additional and apparently newer in-mine drill holes has been added to Table 7.1-5. Locations of five of the eight new in-mine drill holes are on Plates 6-2 through 6-12, but locations of TS-12, TS-13, and TS-14 are not shown. There is no other information on the eight drill-holes.

Bore-holes T-1, T-2, T-4, and T-5 are shown on Plate 6-2 and several other maps. A stratigraphic section based on interpretation of a geophysical log from T-5 is Figure 7.1-5 in the current MRP, but that figure has been removed from the proposed Tank Seam amendment. Other than locations and isopach and coal seam elevation values on Plate 6-2 through 6-12, there is no information on these bore-holes in the Tank Seam amendment. The Tank Seam amendment should include information on these four drill-holes that can be evaluated as part of the TA of the proposed Tank Seam amendment and used in preparing the CHIA. Logs showing the lithologic characteristics and location of ground water where occurring should be in the MRP.

Plates 6-2 through 6-12 also show locations for WHR-1, WHR-2, WHR-3, WHR-5, and WHR-8. These five drill-holes are outside the proposed permit areas but fall within the adjacent area and within the Cumulative Impact Area (CIA). The Tank Seam amendment should include information on these five drill-holes that can be evaluated as part of the TA of the proposed Tank Seam amendment and used in preparing the CHIA. Logs showing the lithologic characteristics and location of ground water where occurring should be in the MRP.

There is no new information on potentially acid- or toxic-forming strata. Mining proposed in the area covered by the Tank Seam amendment should not require a change to the current reclamation plan. Plates 6-2 through 6-12 have been updated and the information can be used to upgrade the subsidence control plan, if necessary.

On page 7-13, Table 2-4 of Appendix 7-J is referred to as a generalized stratigraphic section. Table 2-4 of Appendix 7-J is a table of observation well water-level measurements, not a generalized stratigraphic section.

Page 7-2 refers to Appendix 7-H for detailed hydrologic evaluation of the Starpoint aquifers. The same appendix is referred to on page 7-3 for information on control of ground water movement by faults and dip of the strata. There is no hydrologic evaluation of the Starpoint aquifers or information on faults and dip and their control on ground water in Appendix 7-H, which instead deals with design of reclamation channels. The location of the hydrologic evaluation of the Starpoint aquifers or information on faults and dip and their control on ground water is not known.

Findings:

Information provided in the proposed Tank Seam amendment is not adequate to meet the requirements of the Geologic Resource section. Prior to approval of the amendment the permittee must provide the following in accordance with:

R645-301-624.200, -724.300, -725, the permittee must include information on drilling and completion of wells MW-116 and MW-117 and drill-holes SDH-1, SDH-2, and SDH-3; WHR-1, WHR-2, WHR-3, WHR-5, and WHR-8; and T-1, T-2, T-4, and T-5. Logs that show lithologic characteristics and location of ground water should be included in the MRP. Information on drill-holes should include location and elevation, physical properties and thickness of each stratum, depths, and drilling methods. In addition, information on wells should include construction materials, completion methods, and lithology or stratigraphy of the screened or open zone. This information should be available to the Division for use in preparing the Cumulative Hydrologic Impact Assessment (CHIA).

R645-301-121.200, -622, -624, -724.300, the permittee must retain the information included in Table 7.1-5 concerning twelve in-mine drill-holes, which has been removed in the proposed Tank Seam amendment. Eight apparently new in-mine drill holes have been added to Table 7.1-5; locations of five of the eight new drill-holes are on Plates 6-2 through 6-12, but locations of TS-12, TS-13, and TS-14 are not shown. Locations and elevations, lithology and ground water information from these drill-holes should be provided in the MRP, including logs if they are available.

R645-301-121.200, -622, -624.100, the permittee must correct statements in the text, such as those on pages 7-2 and 7-3, where it says the hydrologic evaluation of the Starpoint aquifers and information on faults and dip and their control on ground water can be found in appendix 7-H. The permittee must correct the statement on page 7-13: table 2-4 of appendix 7-J is not a generalized stratigraphic section of the geologic units.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Baseline information.

This section reviews baseline information as it is related to the proposed tank seam lease addition, added as an attachment to appendix 7-J.

Ground-water information.

Recently obtained data is presented for ground water observation wells in table 2-4. No stratigraphic logs or completion data was presented for SDH-1, SDH-2 or SDH-3. The stratigraphic logs would provide useful information in development of the CHIA.

Table 2-4 includes; water elevations for DH-1A, DH-2 and DH-3A obtained in December 1995; water elevations from drill holes SDH-1, obtained in August 1994; water elevations in SDH-2 and SDH-3, obtained in August 1995; and drill holes MW-117 and MW-116, obtained in September 1996.

The location of SDH-3 was not provided on the monitoring location map. In a telephone discussion with Charles Reynolds, environmental specialist for the Co-Op Mining Company, Charles indicated that only one sample was obtained from well SDH-1 before the well failed. SDH-2 has a faulty water monitoring device, which the mine intends to correct.

SDH-1 and SDH-2 lie between the same geologic fault features north of the minesite and may provide data pertinent to the operations. The MW wells lie outside of these geologic structures and could be influenced separately but, may provide some additional insight to the geohydrology of the area.

The information for SDH-3 is on the opposite side of the Trail Canyon Fault and was not considered associated with this proposed mining block. Little information on Trail Canyon Mine and water associated with it's workings is provided. The information from SDH-3 may provide information pertinent to the Trail Canyon Mine and possibly recharge relationships with Big Bear spring. The stratigraphic logs would provide useful information in development of the CHIA.

Findings in the March 9, 1995 TA stated the following:

"The drilling of DH-4 does not change the conclusions of the past CHIA but, does indicate that any future mining in the Federal lease to the north should be examined to determine the impacts of future mining and interception of the water table."

The separate potentiometric surface of the Starpoint is provided to support a determination that no adverse impact is expected to occur due to mining the Tank Seam. However, there are still unanswered questions about the potentiometric surface to the north of the mine site. Refer to the "Environmental Description" heading in this T.A. The information relating the extent of the mine workings to the uppermost known potentiometric surface of the Blackhawk/Starpoint aquifer was provided in the informal conference. That information should be incorporated in the plan with the northern most extent of workings identified.

Spring Data

Baseline spring sampling was conducted for the sites as identified in table 1 below. The sampling period for most sites was conducted from 1993 through 1994 for sites in McCadden Hollow. While the sampling period for springs within Bear Creek Canyon were conducted between 1993 and 1996.

With the available information on the McCadden Hollow Springs it seems as though the recharge area for most of these sites are localized. With the exception of FBC-4 and FBC-13 which may have a more extensive recharge since flow was observed throughout the monitoring period. These springs appear to be associated with fault/fracture systems and are located at the northern most portion of the canyon. FBC-13 flowed at the highest rate and ranged from 22 to 60 gallons per/minute over the period for which data was collected.

The proposed extent of mining is approximately 2,250.00 feet away from the southern most spring FBC-2 (estimated by the Division from information contained on plates 7-4 and 3-4C). Information on the localized area dip for McCadden Hollow were not presented on the geologic map. However, the regional dip of the lower coal bed north of McCadden Hollow is presented by Dohling 1972, as dipping to the south. Therefore, the likelihood of these springs being impacted during this proposed mining phase would be low. For the presented assumptions and the information reviewed the baseline monitoring for the springs in McCadden Hollow is determined adequate.

The sampling period for springs in Bear Canyon provided a minimum of 2 samples per quarter over the period sampled (except for the 1st quarter when access is difficult). These sites are located above the coal seam and adjacent to the area proposed to be mined. The Bear Canyon Fault is near the springs. The porosity of the fractures/fault system may play a part in flows at these springs. Spring flows from FBC-12 have ranged from 21 to 100 gpm while flows from site 16-7-13-1 ranged from 4 to 12 gpm. These sites are potentially more susceptible to the effects from mining because they are closer to the proposed extent of the mine. However, they do issue out of the formation above the mine and on the east side of the Bear Creek Fault. The furthest proposed extent of mining occurs to the south of these springs and on the west side of the Bear Creek Fault. A 50 foot buffer is proposed along the Creek without pulling the development pillars in order to protect Bear Creek and the Castlegate outcrop. Based on the information reviewed for the Bear Creek Canyon area springs, the operator has obtained adequate baseline data for the proposed tank seam mine operation.

TECHNICAL ANALYSIS

Table 1: Baseline Spring Sampling

Site/Location	Date	Site Condition	Comments
FBC-2/McCadden Hollow.	08/01/91	Flowing	Available in the existing plan.
	10/04/92, 6/21/93, 6/16/94.	Not found	
	3/22/93	No Access	
FBC-3/McCadden Hollow.	08/01/91	Flowing	Available in the existing plan.
	6/21/93, 10/15/93, 6/16/94	Not found	
	3/22/93	No Access	
FBC-4/McCadden Hollow.	6/24/93, 8/29/93, 10/15/93, 6/15/94, 8/30/94, 10/31/94.	Flowing	Existing plan baseline sample obtained 08/01/91, 10/13/92.
	3/22/93, 3/30/94,	No Access	
FBC-12/Bear Creek Canyon.	6/29/93, 8/29/93, 10/15/93, 6/15/94, 8/29/94, 10/31/94.	Flowing	
	3/22/93, 3/30/94,	No Access	
FBC-13/North Slope McCadden Hollow.	8/29/93, 10/15/93, 6/15/94, 8/30/94, 10/31/94, 6/28/95.	Flowing	Not found on map.
	3/22/93, 3/30/94.	No Access	
16-7-13-1/ Bear Creek Canyon.	6/8/94, 10/28/94, 7/10/95, 10/18/95, 7/18/96.	Flowing	Associated Water Right.
	3/22/93, 3/29/95	No Access	

Surface-water information.

No changes in the surface water collection were presented associated with the new lease area. Surface water for the McCadden Hollow Drainage was collected from 1993 through 1994. See table 2. As stated above, the regional dip of the lower coal bed north of McCadden Hollow dips to the

south, the likelihood of the springs being impacted during this proposed mining phase is considered low because these springs issue above the coal and are dissected by the drainage north of the area proposed to be mined. This drainage is described as an intermittent drainage. With the exception of spring run off and precipitation events, it seems as though the base flows are probably fed by the springs from the north side of the drainage (the combined upstream spring flows values are almost equal to the stream flow for measurements made within the same time). For the presented assumptions and the information reviewed the baseline monitoring for the surface water in McCadden Hollow is determined adequate.

Table 2: Surface Water Sampling

Site/Location	Date	Site Condition	Comments
FBC-1/McCadden Hollow.	6/21/93, 8/29/93, 10/15/93, 6/16/94	Flowing	Existing plan baseline sample obtained 07/31/91
	8/30/94, 10/31/94	Dry	Existing plan dry baseline sample obtained 10/04/92
	3/22/93, 3/30/94	No Access	

Baseline cumulative impact area information.

The Division is concurrently conducting an update of the CHIA based on the changes submitted in the PHC. Most of these changes are related to current operations and are not directly a result of the proposed Tank Seam Amendment.

The current MRP and the proposed Tank Seam amendment contain geologic information to assess the probable cumulative hydrologic impacts of the proposed operation and all anticipated mining on surface- and ground-water systems for the cumulative impact area. Additional information is needed for drill-holes SDH-1, SDH-2, and SDH-3; wells MW-116 and MW-117; twelve in-mine drill-holes that were listed previously in Table 7.1-5; eight apparently new in-mine drill-holes that have been added to Table 7.1-5; drill-holes T-1, T-2, T-4, and T-5; drill-holes TS-6, TS-7, TS-8, TS-9, TS-10, TS-12, TS-13, and TS-14 (including locations for the last three); and drill-holes WHR-1, WHR-2, WHR-3, WHR-5, and WHR-8. This has already been discussed in more detail under the Geologic Resource Information section above.

The Division believes the operator may be able to answer these questions through another series of in-mine drilling. Assuming the Tank Seam is above the potentiometric surface and would not effect this surface through the proposed mining, drilling downward to each of the potentiometric surfaces at the location furthest north in the proposed mine workings may provide information to determine whether there is a hydrologic increase in the potentiometric surfaces upgradient of the existing which that may not be accounted for from the dip of the bedding.

Modeling.

No modeling techniques, interpolation, or statistical techniques have been used in preparation of the proposed Tank Seam amendment.

Alternative water source information.

On page 1-11 the plan states "...mitigating measures will be employed if any significant impact occurs." Because this is an underground coal mining activity the requirements of R645-301-727 do not apply. The plan meets the minimum requirements of R645-301-727.

Probable hydrologic consequences determination.

The plan states the following on page 1-8. "Bear Canyon Mine will have no impact on the quantity of groundwater." The plan should clarify this statement presenting discussions of ground water quantity changes contained elsewhere in the plan. The plan contains an incorrect statement suggesting the mine will not affect creek flow. The mine has an on-going minewater discharge that has increased creek flows and has removed groundwater from its stored location. An incorrect statement is made that suspended sediments will be mitigated. A mitigation plan for suspended sediments was not found in the plan. This sentence should be re-stated to be clear and accurate.

The current mining of Lease U-024316 will occur in the Tank Seam only until additional hydrologic and geologic information can be obtained. The Blind Canyon and Tank Seam have recoverable reserves in this lease.

Findings:

The plan does not meet the requirements of this section. Prior to approval of the amendment the permittee must provide the following in accordance with:

R645-301-730, the permittee must provide the related potentiometric surface elevation discussions that incorporate information provided by stratigraphic logs and completion data for SDH-1, SDH-2, SDH-3 and the MW wells.

R645-301-742, the permittee must provide information relating the extent of the proposed mine workings for the Tank Seam to the uppermost potentiometric surface of the Blackhawk/Starpoint aquifer for incorporation into the plan.

R645-301-711, the permittee must provide a clear statements of the past and present operations and historical flow patterns at the minesite. Beginning on page 1-8, the plan says that the Bear Canyon Mine will have no impact on the quantity of groundwater and the mine will not affect creek flow. The mine has an on going

minewater discharge that has increased creek flows and has removed groundwater from its stored location. The statement that suspended sediments will be mitigated should be re-stated to be clear and accurate. A mitigation plan for suspended sediments was not found in the plan.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Affected Area Boundary Maps

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. The additional area is shown on Plate 2-1--Permit Area. Plate 2-1 was certified by Kimly C. Mangum, a licensed professional engineer registered in the state of Utah.

Coal Resource and Geologic Information Maps

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. The geology of the area, the property and lease boundary lines, are shown on Plate 2-1--Geologic Map. Coal resource and geologic information for the lease area was added to Plates 6-1 through 6-12. These plates show the nature, depth, and thickness of the coal seams to be mined, thickness of interburden, and thickness of overburden. Coal crop lines and the strike and dip of the coal to be mined within the proposed permit area are also shown.

There are 3 minable coal seams in Federal Lease U-024316. They are, from lowest to highest, the Hiawatha seam, the Blind Canyon seam, and the Tank seam. The thickness and orientation of the Hiawatha seam are shown, respectively, on Plates 6-7--Hiawatha Seam Isopach Map and 6-8--Hiawatha Seam Structure Contour Map. The thickness and orientation of the Blind Canyon seam are shown, respectively, on Plates 6-3--Blind Canyon Seam Isopach Map and 6-4--Blind Canyon Seam Structure Contour Map. The thickness and orientation of the Tank Seam are shown, respectively, on Plates 6-11--Tank Seam Isopach Map and 6-12--Tank Seam Structure Contour Map. The respective depths of the coal seams are shown on Plates 6-6--Hiawatha Seam Overburden Map, 6-2--Blind Canyon Seam Overburden Map and 6-10--Tank Seam Overburden Map.

All of the maps which were revised in 1997 to show the coal resource and geologic information for Federal Lease U-024316 were certified by Kimly C. Mangum, a licensed professional engineer registered in the state of Utah.

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Mine Workings Maps

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. Plate 3-4C--Bear Canyon No. 2 Mine was revised to show anticipated panel and entry development in the lease area. It also shows; location and extent of known workings of active, inactive, or abandoned underground mines in the Tank Seam. There are no mine openings to the surface within the proposed permit and adjacent areas from this seam. Plate 3-4C was certified by Kimly C. Mangum, a licensed professional engineer registered in the state of Utah.

Monitoring Sampling Location Maps

The amendment includes a monitoring and sample location map. However, previously monitored sites are no longer present on the map. The permit must contain a map that shows all previous and existing monitoring sites. Examples of sites not contained on the map are discussed below.

Drill holes TS-12, TS-13, and TS-14 are listed in Table 7.1-5 but locations could not be found on submitted maps. Water sampling point WM-C and eleven other in-mine drill-holes are listed in Table 7.1-5 of the current MRP (these have been deleted from Table 7.1-5 in the proposed Tank Seam amendment) but could not be located on any submitted maps. Drill holes DH-1A, DH-2, DH-3, and DH-4 are listed in Table 7.1-4 and locations for three of the four bore-holes are on Plate 7-4, but the location of DH-3 is not on any submitted map

Water monitoring points SBC-1, SBC-2, and SBC-3 are listed on page 7-38 but their locations could not be found on Plate 7-4.

Maps showing elevations and locations of monitoring stations used to gather data on fish and wildlife and air quality were not revised for the proposed Tank Seam amendment.

Permit Area Boundary Maps

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. The additional area is shown on Plate 2-1--Permit Area. The proposed amendment is for mining in the Tank Seam only. Plate 2-1 was certified by Kimly C. Mangum, a licensed professional engineer registered in the state of Utah.

Surface and Subsurface Ownership Maps

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. Surface ownership information for the lease area was added to Plate 2-2--Surface Ownership. Subsurface ownership information for the lease area was added to Plate 2-3--Sub-Surface Ownership. Plates 2-2 and 2-3 were both certified by Kimly C. Mangum, a licensed professional engineer registered in the state of Utah.

Well Maps

There are no known oil or gas wells in the permit area.

Findings:

The plan does not meet the requirements of this section. The Permittee should provide the following in accordance with:

R645-301-720, the permittee must provide water monitoring sites on a map which depict the location of all previously monitored and existing monitoring sites. Plate-2 should also be updated according to the proposed monitoring site plan.

OPERATION PLAN

MINING OPERATIONS AND FACILITIES

Regulatory Reference: 30 CFR Sec. 784.2, 784.11; R645-301-231, -301-526, -301-528.

Analysis:

General

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. The additional area is shown on Plate 2-1--Permit Area.

All 3 minable seams--the Tank seam, the Blind Canyon seam, and the Hiawatha seam--are mined in Federal Lease U-024316. The Blind Canyon seam, which is the middle seam, is entered directly through the Bear Canyon #1 portal. The Hiawatha Seam, which is the lower seam, is entered by way of a rock slope from the Blind Canyon Seam. The Tank Seam, which is the upper seam, is entered directly through the Bear Canyon #2 portal. Main entries are columnized to prevent "punching" from the upper to the lower seams.

Findings:

Information provided in the proposed application meets the minimum regulatory requirements of this section.

COAL RECOVERY

Regulatory Reference: 30 CFR Sec. 817.59; R645-301-522.

Analysis:

The addition of Federal Lease U-024316 in 1997 boosted annual production to approximately 750,000 tons. The overall recovery rate in this Federal lease area is expected to be about 50%, which is the national average for room-and-pillar operations of this type.

Findings:

Information provided in the proposed application meets the minimum regulatory requirements of this section.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR Sec. 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Subsidence control plan.

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. Three subsidence monitoring points were added to the existing network to include the Federal lease area. The locations of these points are shown on Plate 3-3--Subsidence Map.

Using standard subsidence charts, the permittee has calculated the maximum anticipated subsidence from the mining of each coal seam and has tabulated that information on page 3C-4. There is, however, an ambiguity in this information. The first line of page 3C-4 says that the calculated subsidence values which follow on that page are for the mining of 3 coal seams. The information which then follows, however, is only for the mining of the Tank Seam and the Hiawatha Seam. This discrepancy must be corrected before this section of the plan can be approved.

Findings:

The amendment does not fulfill the requirements of this section. The permittee must provide the following, prior to approval, in accordance with the requirements of:

R645-301-525.150, the permittee must correct the discrepancies in the calculated subsidence values which are found on page 3C-4.

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.

Known raptor nest sites in the area are shown on Plate 3-3 and in Appendix 10-D. One nest is shown in the Federal Lease which was last surveyed in 1996. The "unknown Buteo" nest was tended in 1991 but not found in 1996. The operator stated that the Forest Service will require annual raptor monitoring on this lease. Major impacts to fish and wildlife would be caused by subsiding the Castlegate cliff escarpment and Bear Creek. The current mining plans associated with this permit

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amendment, 97-1, do not allow for pillaring or second mining under the Castlegate escarpment, thus reducing any chance for subsidence. No mining is currently proposed under Bear Creek where it runs through the Federal Lease.

The operator must commit to either submitting the raptor survey information to the Division or providing the Division with the monitoring information immediately, upon request (in other words a copy must be on file at the mine office). The permit must be updated with the monitoring data every five years.

There is a potential for Townsends and Spotted Bats to occur along the cliff escarpment in Bear Canyon. At this time no survey will be required however, prior to any future request for cliff subsidence a survey will be required.

Bald and golden eagles.

Page 10-14 of the application refers to the bald eagle as endangered. The bald eagle has been down listed to threatened and page 10-14 should be changed to update the information.

Findings:

Information in the Tank Seam Lease Application is not adequate to meet the requirements of the fish and wildlife protection and enhancement plan. Prior to approval the Permittee must provide the following information in accordance with:

R645-301-121.100, the permittee must correct the statement which refers to the bald eagle as endangered. The bald eagle currently has threatened species status.

R645-301-333, the permittee must make a commitment, in the text of the permit, to provide the Division with current raptor monitoring information.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Ground-water monitoring.

Table 7.1-6 indicates under the heading "Type of data Collected and Reported" that ground water quality monitoring for springs will be obtained once for a low flow sample. It is assumed this refers to the baseline data collected and not the quarterly collection. The reclamation monitoring was previously approved for a single sample at low flow. However, this may need to be changed in the future based on information collected until the time when reclamation occurs. The reason this should be assessed is because the potential for impact to water quality is greatest during high flow period if water from the mine is reaching the source. The plan currently meets the minimum requirements of this section. The proposed ground water monitoring is considered adequate for the proposed tank seam amendment.

Surface-water monitoring.

No changes in the surface water collection were presented associated with the new lease area. The existing surface water monitoring is considered adequate for the proposed tank seam amendment.

The reclamation monitoring was previously approved for a single sample at low flow. However, this may need to be changed in the future based on information collected until the time when reclamation occurs. The reason this should be assessed is because the potential for impact to water quality may be greatest during high base flow periods if water from the mine is recharging the streams.

Findings:

The plan meets the minimum requirements of this section as it relates to the tank seam amendment.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Affected area maps.

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. The additional area is shown on Plate 2-1--Permit Area. All other relevant maps were also revised to show the Federal lease. Plate 2-1 and all other revised maps were certified by Kimly C. Mangum, a licensed professional engineer registered in the state of Utah.

Mine workings maps.

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. Plate 3-4C--Bear Canyon No. 2 Mine was revised to show anticipated panel and entry development in the lease area. Plate 3-4C was certified by Kimly C. Mangum, a licensed professional engineer registered in the state of Utah.

Monitoring and sample location maps.

The permit area was enlarged in 1997 to include Federal Lease U-024316, which lies at the north end of the original permit area. Three subsidence monitoring points were added to the existing network to include the Federal lease area. The locations of these points are shown on Plate 3-3--Subsidence Map. Plate 3-3 was certified by Kimly C. Mangum, a licensed professional engineer registered in the state of Utah.

Findings:

Information provided in the proposed application meets the minimum regulatory requirements of this section.