

0011

Document Information Form

Mine Number: C/007/006

File Name: Incoming

To: DOGM

From:

Person N/A

Company N/A

Date Sent: N/A

Explanation:

MINE PLAN INFORMATION

cc:

File in: C/007, 006, Incoming

Refer to:

- Confidential
- Shelf
- Expandable

Date _____ For additional information

MINE PLAN INFORMATION

Mine Name: Star Point Mines State ID: ACT/007/006
 Operator: Plateau Mining Company County: Carbon
 Controlled By: Cyprus Coal Company
 Contact Person(s) Ben Grimes Position: Sr. Environmental
 Telephone: (801) 637-2875 Engineer
 New/Existing: Existing Mining Method: Longwall/Room & Pillar
 Federal Lease No(s): SL-031286, U-7949, U-37045, U-13097
 Legal Description(s): See page 2 of permit

State Lease No(s): 22729
 Legal Description(s): See page 1 and 2 of permit

Other Leases (Identify): GL-20903, 288 (state leases)
 Legal Description(s): See page 1 and 2 of permit

Ownership Data:

<u>Surface Resources (acres)</u>	<u>Existing Permit Area</u>	<u>(New Lands) Proposed Permit Area</u>	<u>Total Life of Mine Area</u>
Federal	<u>4680</u>	<u>5120</u>	<u>5120</u>
State	<u>640</u>	<u>640</u>	<u>640</u>
Private	<u>765</u>	<u>1285</u>	<u>1285</u>
Other			
TOTAL	<u>6085</u>	<u>7045</u>	<u>7045</u>

Coal Ownership (acres):

Federal	<u>4680</u>	<u>5120</u>	<u>5120</u>
State	<u>640</u>	<u>640</u>	<u>640</u>
Private	<u>765</u>	<u>1285</u>	<u>1285</u>
Other (USA)			
TOTAL	<u>6085</u>	<u>7045</u>	<u>7045</u>

File in:

- Confidential
- Shelf
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Refer to Record No 0011 Date _____
 In C/ 007, 006, Incoming
 For additional information

<u>Coal Resource Data:</u>	<u>Total Reserves (1981)*</u>	<u>Total Recoverable (60%) Reserves (1981)</u>
Federal	55,571,000	37,788,300 est.
State	7,217,000	4,078,000 est.
Private	9,382,000	7,211,000 est.
Other		
TOTAL	72,170,000 est.	49,077,300 est.

*Source: Original MRP

<u>Recoverable Reserve Data</u>	<u>Name</u>	<u>Thickness</u>	<u>Depth</u>
Seam	Wattis	4' - 8'	0 - 1500'
Seam	Third	5' - 15'	0 - 1600'
Seam	Hiawatha	2' - 7'	0 - 1700'
Seam			
Seam			
Seam			

Mine Life: 2010 (23 years)
 Average Annual Production: 2-3 Million Tons Percent Recovery: 75%
 Date Projected Annual Rate Reached: Currently (Longwall)
 (Room & Pillar) 55-60%
 Date Production Begins: Currently Date Production Ends: 2010
 Reserves Recoverable By: (1) Surface Mining: _____
 (2) Underground Mining: Room and Pillar & Longwall
 Reserves Lost Through Management Decisions: _____
 Coal Market: Steam Coal and Stoker Coal

<u>Modifications That Have Been Approved:</u>	<u>Date:</u>
<u>See chronology in State Decision Package</u>	
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
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_____	_____
_____	_____

NEW LANDS ADDITION
ADMINISTRATIVE OVERVIEW

Plateau Mining Company
Star Point Mines
ACT/007/006
Carbon County, Utah

August 7, 1987

Background

The Star Point Mines are located approximately 10 miles west of Price, Utah on the east side of the Wasatch Plateau Coal Field. The permit area consists of 6,085 acres comprised of State, Federal coal leases and privately owned holdings.

The Star Point Mines were in operation prior to the enactment of SMCRA and the subsequent Utah Code Annotated (UCA) 40-10-1 et. seq. A permanent program permit was issued to Plateau Mining Company on January 27, 1982.

In December of 1986 Plateau Mining Company (PMC) submitted a permit application to add five new parcels of land to the existing permit area for the Star Point Mines. The five parcels comprise approximately 1,000 acres.

Three of the five parcels do not involve any coal production, but are adjacent to the existing surface facilities area. No new surface disturbance is planned for these areas within the foregoing Five-Year permit term.

Two of the parcels being added to the permit area are contained within the active coal mining areas for the Star Point Mines. The 160 acre parcel contained in Sections 11 and 14 (T15S, R7E) are part of federal coal lease U-13097. This parcel is being added to secure right-of-entry for the proposed graben crossing to access coal reserves in Section 14, 23, 25, and 28 (T15S, R7E), located in the southwest portion of the permit area. No coal production is anticipated in the immediate future (Five-Year Permit term) for this parcel.

Section 18 (T15S, R8E) is fee coal and surface secured from U.S. Fuel Corporation. It comprises the only new parcel where significant coal extraction is planned. Most of the technical analysis for the new lands focuses on the subsidence related issues in Section 18.

Issues of Interest

Longwall extraction in two coal seams was proposed for large portions of Section 18 (T15S, R8E). Since the North Fork of the Right Fork (NFRF) of Miller Creek is a perennial stream, issues relating to the potential subsidence impacts to the stream were significant in this review. As a result of the Technical Analysis, the applicant's proposal was curtailed with appropriate stipulations to lower the risk of impacting NFRF of Miller Creek. Appropriate mitigation measures have also been outlined in the event that an impact does occur.

Recommendations for Approval

Approval of the New Lands addition is recommended based on the PAP and stipulations attached to the permit.

FINDINGS DOCUMENT

Plateau Mining Company
New Lands Addition
Star Point Mines
ACT/007/006, Carbon County, Utah

August 7, 1987

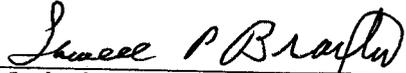
1. The plan and the permit application are accurate and complete and all requirements of the Surface Mining Control and Reclamation Act (the "Act"), and the approved Utah State Program have been complied with (UMC 786.19[a]).
2. The applicant proposes acceptable practices for the reclamation of disturbed lands. These practices have been shown to be effective in the short-term; there are no long-term reclamation records utilizing native species in the western United States. Nevertheless, the regulatory authority has determined that reclamation, as required by the Act, can be feasibly accomplished under the Mining and Reclamation Plan (PAP) (UMC 786.19[b]).
3. The assessment of the probable cumulative impacts of all anticipated coal mining activities in the general area on the hydrologic balance has been made by the regulatory authority. The reclamation plan proposed under the application has been designed to prevent damage to the hydrologic balance in the permit area (UMC 786.19[c] and UCA 40-10-11[2][c]). (See Cumulative Hydrologic Impact Analysis (CHIA) attached to Five-Year Renewal Decision.)
4. The proposed new lands area for the Star Point Mines are:
 - A. not included within an area designated unsuitable for underground coal mining operations;
 - B. not within an area under study for designated lands unsuitable for underground coal mining operations;
 - C. not on any lands subject to the prohibitions or limitations of 30 CFR 761.11[a] (national parks, etc.), 761.11[f] (public buildings, etc.) and 761.11[g] (cemeteries);
 - D. not within 100 feet of the outside right-of-way line of a public road (UMC 761.11);

- E. not within 300 feet of any occupied dwelling (UMC 786.19[d]). (See MRP Section 782.16.).
5. The regulatory authority's issuance of a permit is in compliance with the National Historic Preservation Act and implementing regulations (36 CFR 800) (UMC 786.19[e]). (See attached letter from State Historic Preservation Officer (SHPO) dated August 7, 1987).
 6. The applicant has the legal right to enter and complete reclamation activities in the permit area through federal coal leases SL-031286, U-7949, U-37045, U-13097, state land lease 22729 and certain fee-owned/leased parcels.
 7. The applicant has shown that prior violations of applicable laws and regulations have been corrected (UMC 785.19[g]). (Memo of May 11, 1987 from George Stone, OSMRE).
 8. Neither Plateau Mining Company nor its parent company, Cyprus Western Coal Company, are delinquent in payment of fees for the Abandoned Mine Reclamation Fund (UMC 786.19[h]). (Memo of May 11, 1987, from OSMRE, Washington, D.C.).
 9. The applicant does not control and has not controlled mining operations with a demonstrated pattern of willful violations of the Act of such nature, duration and with such resulting in irreparable damage to the environment as to indicate an intent not to comply with the provisions of the Act (UMC 786.19[i]) (Memo of May 11, 1987, from OSMRE, Washington, D. C.).
 10. Underground coal mining and reclamation operations to be performed under the permit will not be inconsistent with other operations anticipated to be performed in areas adjacent to the proposed permit area (UMC 786.19[j]).
 11. A detailed analysis of the proposed bond has been made. The bond estimate is \$3,407,322.00. The regulatory authority has made appropriate adjustments to reflect costs which would be incurred by the state, if it was required to contract the final reclamation activities for the mine site. The bond shall be posted (UMC 786.19[k]) with the regulatory authority prior to final permit issuance.
 12. No lands designated as prime farmlands or alluvial valley floors occur on the permit area (UMC 786.19[l]).

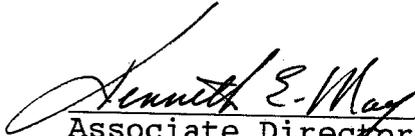
13. The proposed postmining land-use of the permit area has been approved by the regulatory authority (UMC 786.19[n]). (See TA, Section UMC 817.133.)
14. The regulatory authority has made all specific approvals required by the Act, and the Cooperative Agreement and the Federal Lands Program (UMC 786.19[n]).
15. The proposed operation will not affect the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats (UMC 785.19[o]).
16. All procedures for public participation required by the Act, and the approved Utah State Program have been complied with (UMC 786.11-.15).



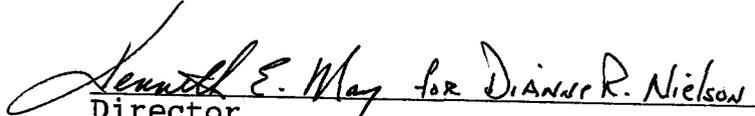
DOGM Lead Reviewer



Administrator, Mineral Resource
Development and Reclamation Program



Associate Director, Mining



Director

PLATEAU MINING COMPANY (PMC)
STAR POINT MINES
NEW LANDS ADDITION
CHRONOLOGY

12/9/86 PMC Submits New Lands Application

2/25/87 DOGM Deficiency Letter Routed to PMC

4/13/87 PMC Responds to DOGM Deficiency Letter of 2/25/87

5/15/87 Letter of Concern from SHPO Routed to PMC Outlining
Need for Additional Cultural Resource Studies

5/29/87 DOGM Determines New Lands Application Administratively
Complete

6/2/87 Public Notice Published in the Emery County Progress
and Sun Advocate Newspapers for Four Consecutive Weeks.

6/24/87 Meeting Held With PMC and DOGM Representatives to
Outline Division Concerns Regarding Undermining of
North Fork of Right Fork (NFRF) of Miller Creek

7/29/87 Additional Cultural Resource Inventory for New Lands
Parcels Forwarded to DOGM from PMC.

8/1/87 Public Comment Period Expires. No Comments Received.

8/7/87 SHPO Clearance Letter With One Stipulation Received

8/7/87 DOGM Makes Findings, Issues Permit

TECHNICAL ANALYSIS ADDENDUM
Plateau Mining Company
Star Point Mine
ACT/007/006
New Lands Application

August 7, 1987

The following sections are modified versions of the Star Point Mines Five-Year Renewal Technical Analysis. Sections have been added and/or modified to appropriately discuss the New Lands addition in conjunction with the Five-Year Renewal analysis.

The primary focus of the New Lands Technical Analysis is in Section 18, T15S, R8E, where longwall mining poses potential subsidence related impacts.

*UMC 782.15 Right of Entry and Operation Information-(JJW)

Applicant's Proposal

The application depicts five additional parcels of land to be added to the existing Star Point Mines permit area (PAP Map 71 as revised). Map 2, Surface Ownership, indicates that Bureau of Land Management public lands outside the coal lease are included in the permit boundary.

Compliance

Since no additional surface disturbance is proposed for the BLM land being included in the permit area adjacent to the existing surface facilities, the application can be approved. However, as outlined in an April 22, 1987 letter from the BLM, if any additional surface disturbance is undertaken on BLM lands, the appropriate rights-of-way, permits and/or leases must be obtained.

The applicant will be in compliance when the following stipulation is met.

Stipulation UMC 782.15-1-(JJW)

Plateau Mining Company shall amend the Permit Application Package (PAP) by October 31, 1987 to commit that prior to initiating additional surface disturbance within the permit area on lands administered by the Bureau of Land Management, the required rights-of-way and/or permit will be obtained from the BLM.

*UMC 817.45-.47 Hydrologic Balance: Sedimentation Ponds-(TM)

Existing Environment and Applicant's Proposal

Seven sediment ponds and one treatment facility have been constructed in conjunction with the runoff control plan and as on-site water pollution control facilities. These structures have been designed to contain the 10-year 24-hour design storm runoff event from disturbed areas and to remove excess suspended sediments picked up from the disturbed areas. They are temporary in nature and will be removed upon completion of the mining operations. No past, present, or future mining has, or will be, conducted beneath any existing sediment pond. One mine water discharge is located in Mud Water Canyon.

Sediment traps are used in various locations on the property. Sediment traps where they are used in conjunction with sediment ponds are not designed structures. They vary in size but are generally less than 3,000 square feet and an average depth of four feet. They are equipped with an overflow culvert or a spillway channel. When they become silted in, they are cleaned out with loaders or a backhoe to make them functional again (PAP, page 784-121).

The overall sediment control plan, including pond location, drainage area characteristics associated with each pond, and other required runoff facilities are illustrated in Map 42 and 43, Surface Water and Sedimentation Control Facilities, Maps A and B (page 784-118, PAP).

Design details for the one treatment facility is shown on Map 53. Sediment Pond design details for ponds 2 through 8 are illustrated on Maps 54 through 60. A stage capacity curve for Treatment Facility 1 is shown on Figure 28, Stage Capacity Curve for Treatment Facility No. 1. The stage capacity curves for the as-built ponds are presented on Figures 29 through 35, Stage Capacity Curve for Sediment Ponds 2 through 8.

Additional Design Details for Sediment Volume, Runoff Volume, Pond Detention, Spillway Capacity, Embankment Height and Width, Side Slopes, Anti-Seep Collars, Riprap Protection, and

Compactions are discussed on page 784-119 through 784-128 of the PAP. The adequacy of these design parameters will be discussed in the Compliance section.

Compliance

The applicant adequately describes the standard engineering practices used to design, construct, and certify all treatment facilities at Plateau (p. 784-117 and 784-118). All of the sedimentation ponds have been approved by the Division. The eight sedimentation ponds are classified as Treatment Facility No. 1 and Sedimentation Pond Nos. 2 through 8. Sedimentation Pond No. 1 was officially designated as Treatment Facility No. 1 by a letter from Dianne R. Nielson to PMC on July 19, 1984. Additionally, variances were granted for Sedimentation Ponds #3 and #5 for 817.46(r) (design and inspection during construction under the supervision of a registered professional engineer). As-built survey information was submitted for Ponds #3 and #5 with a certified stability analysis. The Division granted variances for these two ponds in a letter dated December 7, 1984.

Sedimentation ponds #4, #6, and #7 were certified on November 16, 1981. Sedimentation Pond #2 was certified on August 19, 1986. Sedimentation Pond #8 was certified and approved with the Unit Train Loadout, May 2, 1985.

The sediment design parameters for Ponds 1 through 8 have been summarized in Table 85. The applicant has not stated the design cleanout elevations for any of their ponds. In the applicant's response to the Division's renewal review, the applicant stated that he will survey the ponds to determine if they have reached the 60 percent cleanout level, and then determine if cleanout is necessary. Therefore, the applicant will include on their quarterly pond inspection forms, the cleanout volume (ac. ft.) for each facility and an updated sediment volume (ac. ft.) based on a current survey of each facility. This will supply adequate documentation for inspection of these facilities to be carried out.

In the case of ditches 43, 44, and 45 designed and placed along the existing access road to Sediment Pond No. 4, located in Section 10, T15S, R8E, two sediment traps or silt fences will be used instead of a sediment pond. Since these structures are to be used in lieu of a sediment pond, the applicant must submit detailed drawings for the sediment traps planned, or the silt fences, if used. The dimensions suggested of 30 by 100 feet, 4 feet deep, appear in excess of a small sediment trap design.

The applicant states that the riprap protection for all ponds and treatment facilities is currently in place in inlet channels, around spillway risers, and at spillway outlets. The applicant has

chosen to postpone a response to the Division's request for the D-50 of the riprap, manning's n values, and the depth, width and length of protection for all pond inlets and outlets. The applicant states that this will require assembling data from past submittals and field work to verify inlet and outlet protection, riprap location, riprap type, and showing this information on maps.

The applicant will be in compliance when the following stipulations are met.

Stipulation 817.45-.47-(3)-(TM)

1. Plateau Mining Company shall submit by October 31, 1987, for inclusion in the PAP, detailed calculations, maps and drawings showing the nature and location of pond outlet and inlet protection measures presently installed with supporting calculations which demonstrate the adequacy of these measures.
2. Plateau Mining Company will include on their quarterly sediment pond inspection forms, the cleanout volume (Ac.Ft.) for each facility and an updated sediment volume (Ac.Ft.) based on a current survey of each pond and treatment facility.
3. Plateau Mining Company shall submit by October 31, 1987, detailed silt fence design drawings showing design height, materials used, and general field construction details. Moreover, PMC shall submit by October 31, 1987, detailed sediment trap design drawings showing size, depth and location, a 60 percent sediment cleanout elevation for these structures with a location map of a scale greater than Map 43, sufficient to determine drainage area, ditch location, and ditch length contributing to these structures.

*UMC 817.52 Surface and Ground Water Monitoring-(RVS/TM)

Existing Environment and Applicant's Proposal

Baseline water quality samples will be analyzed for the parameters listed in Table 82, Baseline Low Flow Water Quality Analytical Schedule. Operational water quality samples will be analyzed for the parameters presented in Table 81, Operational Water Quality Analytical Schedule. Baseline and operational monitoring will be conducted at the monitoring stations identified on Map 26, Ground and Surface Water Monitoring Sections with Water Quality Data in accordance with the time schedule indicated in Table 80.

The parameter sampling frequency procedures and future sampling intent has been stated on pages 784-79 through 784-88 of the PAP.

On April 9, 1987, the Division met with Plateau Mining Company (PMC) to discuss a revised spring monitoring plan based on the information received to date. Based on that meeting, PMC proposes to drop from the plan as outlined in the 5-year permit renewal PAP and New Lands PAP the following springs: S17-2, S7-1, S11-1, 530, 85-26-1, 734 and 452. The following springs will be added to those sampled: 518, 429, 433, 443, and 444.

Springs 429, 433, 443, and 444 will be monitored for baseline starting this year, then dropped until mining commences in Lease U-13097. Spring 518 will be monitored on an operational basis starting this year.

In regards to monitoring the Right Fork of North Fork of Miller Creek, the applicant plans on using Station ST-1 to monitor for any changes in flow. It will be monitored monthly June through October (PAP, page 784-62b). PMC will also inspect the stream channel of the North Fork of the Right Fork of Miller Creek during the season when access is possible (June through October).

The applicant has stated that they will monitor springs 229, S18-2, and 500 in their ICR/TD response. After looking at the springs in the vicinity and where they are located on the spring map, the applicant feels that these springs would be adequate to monitor for mining subsidence impacts.

Compliance

The Division has concurred with the applicant on their revision to the proposed monitoring schedule in the PAP. The Forest Service has reviewed these changes and discussed these changes with the Division in a June 2, 1987 meeting. They also concur with these changes except that they would like the applicant to continue monitoring Spring S11-1 through 1987 with at least one sample being collected at low flow. This request was based on the water rights associated with Little Park Creek and mining to the east of this spring. The Forest Service will assess the data collected from sampling Spring S11-1 at the end of this year to determine if they would like continued monitoring in 1988. USFS is also compiling a list of springs on their own this field season, and this winter will provide a comprehensive list of high resource value springs.

The applicant has proposed to drop certain parameters from their surface and ground water quality sampling program. The Division does not concur with elimination of the baseline parameters spelled out on pages 784-82 through 784-85 for baseline data collection. If at the end of one year's baseline data collection for new sites

(four water quality samples including high and low flow), certain parameters (those mentioned on pages 784-82 through 784-85 of the PAP) are not found in significant concentrations, then the Division would consider approving an amendment to the plan for the the second year of baseline monitoring. The complete baseline parameter list will be sampled every fifth year for all sites.

In Section 18, T15S, R8E, a separate assessment of impacts to surface and groundwater has been carried out due to potential impacts associated with undermining the NFRF Miller Creek. Based on the Division's monitoring guidelines and paucity of baseline data in this area and current mining sequence in Section 18, the following springs were chosen by the Division to be monitored: (Springs 229, 238, 239, 494, and 500). Springs 238 and 494 are in excess of the springs chosen for monitoring by Plateau.

Two sources of data exist to describe the hydrologic characteristics of surface waters found in the NFRF Miller Creek. The major source of data is found in Plateau's annual water quality data listings through 1986 for Station ST-1. This station is located approximately 3.3 miles downstream from the headwaters of the NFRF Miller Creek. Six years of record have been recorded at this site. The average flow for this site over the period of record is .56 CFS or 251.3 GPM with a high flow recorded on 6/13/85 of 2.0 CFS or 897.6 GPM and a low flow recorded on 2/18/81 of .05 CFS or 22.4 GPM.

At this same site the average electrical conductivity was 1334.7 UMHOS/CM with a high value recorded on 9/17/80 of 1900 UMHOS/CM and a low value recorded on 6/22/82 of 370 UMHOS/CM. Fourteen discharge values were used to complete the average and seventeen conductivity values were used to complete the average.

The second source of data for the NFRF Miller Creek is a stream survey completed on the upper reaches of the creek in Section 18 and 17, T.15S. R8E. The purpose of this survey was to identify the gaining and losing reaches of the creek in these two sections. Flow measurements and conductivity readings were taken approximately every 1000 feet. All inflows were identified and measured. If mining were to occur as identified in the New Lands Permit Application, Stations M-1 through M-8 would be the closest to the potentially subsided area. An average of the electrical conductivity readings in this reach of the creek was 391.3 UMHOS/CM for Stations M-4, 6 and 8. The total flow at Station M-8 was 62 GPM.

The data from each station in this portion of the creek identified each reach in this stretch of creek as a gaining reach.

From Station M-6 to M-8 was identified as gaining the most flow of +15 GPM.

The data collected at the downstream Station ST-1 does not adequately represent or define what is occurring in the upper reaches of Miller Creek. The variance in electrical conductivity, the abundance of springs and the physical distance of 3.3 miles between the two sites does not reflect similarities in data or provide an avenue for assessment between ST-1 and the upper reaches of the NFRF Miller Creek.

Both water quality and quantity of flow in the upper reaches of Miller Creek has not been well defined. A continuous monitoring station at M-8 on map 29 must be installed and that data must be collected on a continuous basis for at least 2 years on a monthly basis per Division guidelines to define the hydrologic resources of this reach of Miller Creek. Also, stream surveys in July and September defining gaining or losing reaches would be appropriate to define base flow recharge conditions in this reach of stream.

Baseline water quality parameters and baseline flow data from a continuous monitoring station at M-8 must be established for this reach of Miller Creek prior to any mining.

The applicant will be responsible to keep the Division informed of mining sequence changes on a yearly basis so that spring monitoring sites can be revised according to mining sequence changes and adequate baseline data can be collected prior to any mining impacts being realized.

The applicant will be in compliance with this section when the following stipulations are met.

Stipulation 817.52-(4)-(TM)

1. Plateau Mining Company (PMC) shall upon permit approval, utilize the monitoring stations proposed in PMC's April 30, 1987 letter to the Division. Moreover, PMC shall monitor springs S11-1, 238, and 494 at least one time in 1987 during low flow conditions in accord with the approved monitoring plan.
2. By October 31, 1987, Plateau Mining Company shall update the PAP water monitoring plan including text and tables, to:
 - a. reflect the revised monitoring stations proposed in PMC's April 30, 1987 letter to the Division as well as to add springs 238 and 494 to the monitoring program.

- b. reflect that all new source and existing baseline monitoring points for surface and groundwater monitoring shall be monitored in accord with the Division's baseline parameter list for a two year period.
3. Plateau Mining Company will, by August 31, 1987, install a continuous monitoring station at Station M-8 as shown on Map 29. PMC will begin to monitor stream flow continuously and water quality monthly from August 31, 1987 until October 31, 1987, weather permitting. Monitoring will be undertaken from June until October per the baseline water quality parameter list through 1988 and 1989.
4. Plateau Mining Company will amend the current PAP by August 31, 1987 to commit to carry out stream surveys equivalent to the one carried out in the NFRF Miller Creek on July 2, 1986, in July and September of every year mining occurs, including 1987, within Section 18 of the New Lands Permit Area, and until subsidence impacts have been stabilized. PMC will flag and determine the exact location of each monitoring station for the survey so the survey can be carried out at the same stations using the same monitoring methods, on a yearly basis.

*UMC 817.57 Hydrologic Balance: Stream Buffer Zones--(KMM)

Existing Environment and Applicant's Proposal

The permit area contains the headwaters of two small perennial streams - Miller and Tie Fork Creeks. The latter includes Gentry Hollow and Wild Cattle Hollow Forks. There is currently no mining or surface facilities within 100 feet of these streams but mining is planned in Section 18 beneath the NFRF Miller Creek. Aquatic resource studies (pages 783-115 to 123) indicate no degradation to water quality or quantity from the applicant's operations. Subsidence cracks are the only surface disturbances in the Miller Creek drainage area and these are limited to the ridge (page 783-121). Subsidence is not expected to impact Wild Cattle or Gentry Hollow (page 783-122), but may impact NFRF Miller Creek (page 784-62a-c) (See also UMC 817.126 discussion).

Mine water discharge from the Mudwater Fan Breakout has changed Mudwater Creek to a perennial stream. The water discharge is subject to an NPDES permit and is monitored regularly to determine impacts on water quality (page 784-146).

The Corner Canyon Fan Breakout is the only facility in proximity to an intermittent channel. The breakout was constructed so as not to impact the stream and the site has been posted for a stream buffer area (page 784-147).

Compliance

In discussions found on pages 783-122, 784-62b-c, mitigation measures are discussed regarding the possible repair of cracks in the stream channel of the NFRF Miller Creek. The applicant suggests the following mitigation measures will be tried.

1. Seal the cracks in the stream channel with bentonite or other environmentally safe materials;
2. If cracks are too large, rags or some material, will be hand placed in them at a depth of approximately two feet to provide a stop point for bentonite pellets;
3. Concrete or epoxy mixtures;
4. Surface stabilization accomplished by hand tools.

All these methods will be accomplished by diverting flow with culverts, flexible fabric tubing, or plastic liners. These methods will be carried out until the ground stabilizes (page 784-62b & c). Of the methods mentioned, Method #2, the use of rags or other materials to fill large cracks, does not appear to be a permanent environmentally sound method, and therefore is not recommended. Methods 1, 3, and 4 may involve transportation of large amounts of materials into a very remote area (i.e., grout, bentonite, epoxy, etc.), but appears to be common engineering practice. The Division considers foot travel or helicopter the only acceptable means of transportation suggested by the applicant due to the remote steep canyon environment.

In regards to diversion of the stream during implementation of any of these methods, a detailed assessment of flow regimes in the NFRF Miller Creek will be required. Data will be collected at the monitoring station set up at Station M-8 per the requirements spelled out under Stipulation #2, UMC 817.52, to help define flow regimes. The applicant will be required to provide details regarding the use of cutoff walls, etc., upstream of the diversion to enable the flow to enter the culvert (flexible tubing or plastic liner). The applicant will have to maintain this diversion until such time as the subsidence stabilizes and the stream is restored.

Since it is impossible to predict what exactly will occur, Plateau will be required to notify the Division immediately upon discovery of a subsidence crack or potential problem, and have the appropriate mitigation measure to restore the integrity of the NFRF Miller Creek in place within seven (7) days of discovery.

The applicant will be in compliance when the following stipulations are met.

Stipulation UMC 817.57-(2)-(TM)

1. Plateau Mining Company will amend the PAP by October 31, 1987 to commit to notify the Division immediately upon discovery of a crack or surface related impact to the NFRF Miller Creek. PMC will undertake the most appropriate approved mitigation plan to restore the integrity and flow of the NFRF Miller Creek channel and have this measure in place within seven (7) days of discovery of a crack or subsidence related impact.
2. Plateau Mining Company shall provide by October 31, 1987, for insertion into the PAP, design detail for the cutoff walls to be used in the event of a temporary diversion of North Fork of the Right Fork of Miller Creek.

*UMC 817.59 Coal Recovery-(PGL)

Existing Environment and Applicant's Proposal

The operator has committed to maximum coal recovery while using the best technology currently available and maintaining environmental integrity through underground coal mining activities. An approved Resource Recovery and Protection Plan is shown in Exhibit 39.

Compliance

The applicant's Resource Recovery and Protection Plan approved March 20, 1981 is valid.

Section 18 (fee land) will be mined in compliance with UMC 817.121-.126, and therefore, meet the requirements of maximizing recovery while maintaining environmental integrity.

The applicant is in compliance with this section.

Stipulations

None

*UMC 817.121-.126 Subsidence Control-(RVS)

Existing Environment and Applicant's Proposal

The applicant provides information about subsidence on pages 784-134 through 784-143. Supplementary subsidence information is given on Maps 5, 6, 61, 62 and in Table 89.

Mining will occur in the Hiawatha seam, Third seam and Wattis seam. Coal extraction will occur by longwall methods in the Wattis

and Third seams and by continuous room and pillar methods in the Hiawatha seam (PAP, page 784-3). Multiple seam mining will primarily occur beneath the northern portion of Hoag Ridge (Section 12, T15S, R7E). The operator estimates that maximum subsidence will be 70 percent of extraction height (PAP page 784-136). Accordingly, in Section 12 (three seams) and Section 18 (2 seams) are projected to be mined with cumulative maximum subsidence anticipated to be less than 14 and 10 feet respectively. Maximum subsidence beneath Gentry Ridge, where the Wattis seam is projected to be mined, will be less than 5 feet.

Overburden thicknesses range from 700 to 1500 feet in the northern portion of Hoag Ridge (includes Section 12) and 1000 to 1700 feet in the Gentry Ridge area. The operator gives a value of 22 1/2 degrees for the angle-of-draw within and adjacent to the permit area (PAP, 784-136). Map 61 locates subsidence-induced tension cracks that have developed over previously mined areas above Star Point.

The applicant proposes to conduct single and double-seam mining beneath the NFRF Miller Creek, a perennial stream (maps 5 and 6). The applicant commits to restricting single- and double-seam mining to areas where overburden exceeds 400 and 480 feet, respectively. Two risk areas labelled "A" and "B" (Figure 1, Exhibit 30) have been identified for development of surface tension cracks.

The applicant identifies renewable resource lands above areas of current and projected mining. The applicant concludes, on the basis of mining methods, stratigraphy and overburden thickness that surface manifestations of subsidence (tension cracking, catastrophic failure) and impacts to renewable resource lands (springs, livestock grazing) will be minimal. However, where subsidence causes tension cracks that are hazardous to livestock or wildlife, the applicant commits to restoring the land surface. Where tension cracks preclude grazing or result in injured or killed livestock, the applicant commits to compensating owners at fair market value for losses.

Ground-water resources (springs) that are materially damaged by mining-induced subsidence will be rehabilitated or mitigated (PAP, pages 817-22 and 817-23). The applicant presents a plan for sealing tension cracks that may potentially form and divert flow within the channel of NFRF Miller Creek (PAP, page 784-62b). The plan incorporates inserting bentonite pellets, rags, concrete, or epoxy into tension cracks to prevent flow loss. The applicant recognizes that mining past outcropping Castlegate Sandstone in Section 18 may cause cliff failure (PAP, page 783-113).

The operator identifies three structures (powerline, cabin, TV towers) that occur above areas that were mined prior to 1977 (Map 1,

Sheet 2) and therefore, are considered to be located above areas that have stabilized. The operator does not anticipate subsidence-induced damage to these structures and does not propose specific mitigation plans.

The operator proposes to monitor vertical and horizontal ground movement by photogrammetric methods, surveying of monuments and visual observations during surface traverses. Photogrammetry will be the primary method for quantifying ground movement. Surface monument surveys will be utilized to determine the resolution of photogrammetric methods. Maps 61, 61A, and 61C show the subsidence monitoring points above longwall panels. Maximum measured subsidence, to date, is two feet (Map 61). The operator commits to conducting an annual field survey (surface traverse) and indicates that monument surveying will be conducted on an irregular basis and eventually phased out (PAP, p. 784-141). Results of surveys will be submitted to the Division on an annual basis (PAP, page 784-142). Surface owners will be notified of the mining schedule according to UMC 817.122.

Compliance

The applicant has provided information about mining methods and locations, overburden thickness and lithology, vertical movement, renewable resource lands and structures.

The applicant has provided a subsidence monitoring plan that identifies monitoring stations and describes schedules for collecting and submitting quantitative data. The subsidence monitoring plan does not incorporate deriving vertical and horizontal movement data from stations located along NFRF Miller Creek. The proposed subsidence monitoring plan does not comply with the requirements of UMC 817.121.

The applicant commits to notifying surface owners according to UMC 817.122.

Maximum subsidence of up to 14 feet is projected for areas of Hoag Ridge where approximately eight springs occur. In addition, approximately 43 springs occur above portions of Gentry Ridge and section 18, where maximum subsidence is projected to be less than five and ten feet respectively. The applicant cannot exclude the possibility of subsidence-induced material damage that results in the reduction of reasonably foreseeable use of surface lands. Although the applicant has provided mitigation plans for loss of grazing habitat and springs, the PAP lacks a plan for evaluating impacts and rehabilitating or restoring vegetation that is impacted by cliff failure. The applicant has also provided a plan that is evaluated under UMC 817.57 for mitigating material damage to NFRF Miller Creek. In summary, the applicant has not provided adequate plans to completely address the requirements of UMC 817.124.

The applicant has integrated site-specific subsurface data with information from elsewhere (New Mexico, Europe) to derive a plan for mining beneath NFRF Miller Creek and identify potential subsidence-induced material damage to the perennial stream (Exhibit 30). The Division concurs with the applicant's assessment of the risk for development of material damage (tension cracking) at localities A and B. Further technical review revealed that premises used to predict rock failure are based on tenuous geologic and topographic analogies, and therefore, are considered of limited applicability to the Wasatch Plateau Coal Field or Section 18. Hence, derived overburden thicknesses (400 and 480 feet) do not substantiate that proposed development will prevent subsidence-induced material damage to NFRF Miller Creek. The applicant's proposal for longwall development beneath NFRF Miller Creek does not comply with the requirements of UMC 817.126.

The applicant will be in compliance with this section when the following stipulations are met.

Stipulation UMC 817.121-(1)-(RVS)

1. Plateau Mining Company will provide, by August 31, 1987, a subsidence plan for monitoring vertical and horizontal movement along NFRF Miller Creek.

Stipulation UMC 817.124-(1)-(KMM)

1. Plateau Mining Company will, by October 31, 1987, commit to providing in the Annual Subsidence Report:
 - (A) an assessment of the impacts of cliff failure and resulting talus slope formation on vegetation and wildlife resources.
 - (B) An acceptable vegetation/mitigation plan to be implemented in the first normal season after significant subsidence and cliff failure ceases.

Stipulation UMC 817.126-(2)-(RVS)

1. Plateau Mining Company will, by October 31, 1987, commit to restricting longwall mining in panel three (Section 18) of the Wattis seam to areas of 500 or more feet of overburden. Moreover, in areas of 400 to 500 feet of overburden in Panel three (Section 18), the applicant will commit to mining by the room and pillar method with retention of pillars that are properly sized to maintain the integrity of NFRF Miller Creek.

2. Longwall mining and development in Panels 7 and 8 (Section 18, third panel), may not proceed until:
 - (A) PMC has identified, to the Division's satisfaction, subsidence-induced material damage associated with Wattis seam mining, and
 - (B) the Division has evaluated potential environmental degradation.

1273R
JJW

FEDERAL
(April 1987)

Permit Number ACT/007/006, 8-87

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
(801) 538-5340

This permit, ACT/007/006, is issued for the state of Utah by the Utah Division of Oil, Gas and Mining (DOGM) to:

Plateau Mining Company
P. O. Drawer PMC
Price, Utah 84501
(801) 637-2875

for the Star Point Mines. Cyprus Western Coal Company, parent company of Plateau Mining Company, is the lessee of federal coal lease SL-031286, U-7949, U-37045, and U-13097, the lessee of state coal lease 22729 and/or the owner of certain fee-owned parcels. A performance bond is filed with the DOGM in the amount of \$3,407,322.00, payable to the state of Utah, Division of Oil, Gas and Mining and the Office of Surface Mining, Reclamation and Enforcement (OSMRE). DOGM must receive a copy of this permit signed and dated by the permittee.

Sec. 1 STATUTES AND REGULATIONS - This permit is issued pursuant to the Utah Coal Mining and Reclamation Act of 1979, Utah Code Annotated (UCA) 40-10-1 et seq, hereafter referred to as the Act.

Sec. 2 PERMIT AREA - The permittee is authorized to conduct underground coal mining activities on the following described lands (as shown on the map appended as Attachment B) within the permit area at the Star Point Mines situated in the state of Utah, Carbon County, and located:

T15S, R7E

Sec. 1: S1/2
Sec. 2: SE1/4 SE1/4
Sec. 11: E1/2 NE1/4, NE1/4 SE1/4
Sec. 12: All
Sec. 13: N1/2
Sec. 14: S1/2, E1/2 NE1/4, SW1/4 NE1/4
Sec. 23: All
Sec. 25: W1/2 NW1/4
Sec. 26: N1/2

T15S, R8E

- Sec. 5: W1/2 NW1/4, NW1/4 SW1/4
- Sec. 6: E1/2 NW1/4, E1/2 SW1/4, SW1/4 SW1/4
W1/2 NE1/4, SE1/4 NE1/4, SE1/4
- Sec. 7: All
- Sec. 8: W1/2 NW1/4, SW1/4, SE1/4 SE1/4, S1/2 SW1/4 SE1/4
- Sec. 9: SW1/4 SW1/4, SE1/4, E1/2 SW1/4
- Sec. 10: SW1/4, W1/2 SE1/4, SE1/4 SE1/4
- Sec. 11: Portions of S1/2 SW1/4
- Sec. 15: N1/2 NW1/4, N1/2 NE1/4
- Sec. 16: All
- Sec. 17: E1/2, NW1/4, portions of NW1/4 SW1/4
- Sec. 18: N1/2, Portions of N1/2 SE1/4, N1/2 SW1/4
- Sec. 20: NE1/4
- Sec. 21: E1/2 NW1/4

Sec. 3: PERMIT TERM - This permit expires on January 27, 1992.

Sec. 4 ASSIGNMENT OF PERMIT RIGHTS - The permit rights may not be transferred, assigned or sold without the approval of the Director, DOGM. Transfer, assignment or sale of permit rights must be done in accordance with applicable regulations, including but not limited to 30 CFR 740.13(e) and UMC 788.17-.19.

Sec. 5 RIGHT OF ENTRY - The permittee shall allow the authorized representative of DOGM, including but not limited to, inspectors and representatives of OSMRE, without advance notice or a search warrant, upon presentation of appropriate credentials, and without delay to:

- A. have the rights of entry provided for in 30 CFR 840.12, UMC 840.12, 30 CFR 842.13 and UMC 842.13; and,
- B. be accompanied by private persons for the purpose of conducting an inspection in accordance with UMC 842.12 and 30 CFR 842, when the inspection is in response to an alleged violation reported by the private person.

Sec. 6 SCOPE OF OPERATIONS - The permittee shall conduct underground coal mining activities only on those lands specifically designated as within the permit area on the maps submitted in the permit application and approved for the term of the permit and which are subject to the performance bond.

- Sec. 7 ENVIRONMENTAL IMPACTS - The permittee shall minimize any adverse impact to the environment or public health and safety through but not limited to:
- A. accelerated monitoring to determine the nature and extent of noncompliance and the results of the noncompliance;
 - B. immediate implementation of measures necessary to comply; and
 - C. warning, as soon as possible after learning of such noncompliance, any person whose health and safety is in imminent danger due to the noncompliance.
- Sec. 8 DISPOSAL OF POLLUTANTS - The permittee shall dispose of solids, sludge, filter backwash or pollutants in the course of treatment or control of waters or emissions to the air in the manner required by the approved Utah State Program and the Federal Lands Program which prevents violation of any applicable state or federal law.
- Sec. 9 CONDUCT OF OPERATIONS - The permittee shall conduct its operations:
- A. in accordance with the terms of the permit to prevent significant, imminent environmental harm to the health and safety of the public; and
 - B. utilizing methods specified as conditions of the permit by DOGM in approving alternative methods of compliance with the performance standards of the Act, the approved Utah State Program and the Federal Lands Program.
- Sec. 10 AUTHORIZED AGENT - The permittee shall provide the names, addresses and telephone numbers of persons responsible for operations under the permit to whom notices and orders are to be delivered.
- Sec. 11 COMPLIANCE WITH OTHER LAWS - The permittee shall comply with the provisions of the Water Pollution Control Act (33 USC 1151 et seq,) and the Clean Air Act (42 USC 7401 et seq), UCA 26-11-1 et seq, and UCA 26-13-1 et seq.

- Sec. 12 PERMIT RENEWAL - Upon expiration, this permit may be renewed for areas within the boundaries of the existing permit in accordance with the Act, the approved Utah State Program and the Federal Lands Program.
- Sec. 13 CULTURAL RESOURCES - If, during the course of mining operations, previously unidentified cultural resources are discovered, the permittee shall ensure that the site(s) is (are) not disturbed and shall notify DOGM. DOGM, after coordination with OSMRE, shall inform the permittee of necessary actions required. The permittee shall implement the mitigation measures required by DOGM within the time frame specified by DOGM.
- Sec. 14 APPEALS - The permittee shall have the right to appeal as provided for under UMC 787.
- Sec. 15 SPECIAL CONDITIONS - In addition to the general obligations and/or requirements set out in the leases, the federal mining plan approval, and this permit, the permittee shall comply with the special conditions appended hereto as Attachment A.

The above conditions (Secs. 1-15) are also imposed upon the permittee's agents and employees. The failure or refusal of any of these persons to comply with these conditions shall be deemed a failure of the permittee to comply with the terms of this permit and the lease. The permittee shall require his agents, contractors and subcontractors involved in activities concerning this permit to include these conditions in the contracts between and among them. These conditions may be revised or amended, in writing, by the mutual consent of DOGM and the permittee at any time to adjust to changed conditions or to correct an oversight. DOGM may amend these conditions at any time without the consent of the permittee in order to make them consistent with any new federal or state statutes and any new regulations.

THE STATE OF UTAH

By: _____

Date: _____

I certify that I have read and understand the requirements of this permit and any special conditions attached.

Authorized Representative of
the Permittee

Date: _____

APPROVED AS TO FORM:

By: _____
Assistant Attorney General

Date: _____

ATTACHMENT "A"

STIPULATIONS

Plateau Mining Company
Star Point Mine
ACT/007/006, Carbon County, Utah

August 5, 1987

Stipulation UMC 771.19-(2)-(JW)

1. Underground coal mining activities shall not commence within any federally leased coal contained in the New Lands parcels until the Mining Plan Modification is approved by the U.S. Department of Interior. The Division reserves the right to amend this permit (ACT/007/006) to incorporate any changes or requirements set out in the approved Mining Plan Modification.
2. Plateau Mining Company shall complete further testing of site 42Em2118 as described in the Abajo Archeology report of July 1987 in order to determine eligibility for the National Register of Historic Places. The testing shall be done in accord with standards prescribed by the Utah Division of State History. Results from the testing will be forwarded to the Division of Oil Gas and Mining by October 31, 1987. If site 42Em2118 is determined to be eligible for listing, then PMC shall avoid any further disturbance of the site until appropriate mitigation measures are approved by the Utah Division of State History and the measures are fully implemented

Stipulation UMC 782.15-1-(JW)

Plateau Mining Company shall amend the Permit Application Package (PAP) by October 31, 1987 to commit that prior to initiating additional surface disturbance within the permit area on lands administered by the Bureau of Land Management, the required rights-of-way and/or permit will be obtained from the BLM.

Stipulation 817.11-(1)-(PGL)

The Plateau Mining Company shall submit by October 31, 1987 for inclusion in the PAP, all details about signs and markers as required by this regulation.

Stipulation 817.24-(1)-(DD)

Plateau Mining Company must submit by October 31, 1987, for insertion into the PAP, a mass balance of all areas to be retopsoiled. This will include acreage figures of all locations to be retopsoiled, depth of topsoil to be redistributed, and amount and location of material presently stockpiled. The applicant must also commit to sample soils before reclamation on areas of the Lion Deck Portal that will be used for reclamation.

Stipulation 817.43-(1)-(TM)

Plateau Mining Company shall submit by October 31, 1987, for inclusion in the PAP, flow, velocity, and sizing calculations, location maps, and inlet and outlet protection measures for all culverts in the disturbed area.

Stipulation 817.44-(1)-(TM)

Plateau Mining Company shall submit by October 31, 1987 for inclusion in the PAP, complete and adequate design, calculations, profiles, cross sections, and drawings to detail final reclamation and channel restoration measures which will be employed. This will include post mining drainage patterns, and water monitoring locations.

Stipulation 817.45-.47-(2)-(TM)

1. Plateau Mining Company shall submit by October 31, 1987, for inclusion in the PAP, detailed calculations, maps and drawings showing the nature and location of pond outlet and inlet protection measures presently installed with supporting calculations which demonstrate the adequacy of these measures.

Stipulation 817.45-.47-(2)-(TM) (Cont'd.)

2. Plateau Mining Company will include on their quarterly sediment pond inspection forms, the cleanout volume (Ac.Ft.) for each facility and an updated sediment volume (Ac.Ft.) based on a current survey of each pond and treatment facility.
3. Plateau Mining Company shall submit by October 31, 1987, detailed silt fence design drawings showing design height, materials used, and general field construction details. Moreover, PMC shall submit by October 31, 1987, detailed sediment trap design drawings showing size, depth and location, a 60 percent sediment cleanout elevation for these structures with a location map of a scale greater than map 43 sufficient to determine drainage area, ditch location, and ditch length contributing to these structures.

Stipulation 817.49-(1)-(PGL)

Prior to final reclamation, Plateau Mining Company must submit definite plans for the disposition of all of the impoundments. If the applicant retains any of the impoundments permanently, all of the criteria for permanent impoundments must be met according to UMC 817.49.

Stipulation 817.52-(2)-(TM)

1. Plateau Mining Company (PMC) shall upon permit approval, utilize the monitoring stations proposed in PMC's April 30, 1987 letter to the Division. Moreover, PMC shall monitor springs S11-1, 238, and 494 at least one time in 1987 during low flow conditions in accord with the approved monitoring plan.
2. By October 31, 1987, Plateau Mining Company shall update the PAP water monitoring plan including text and tables, to:
 - a. reflect the revised monitoring stations proposed in PMC's April 30, 1987 letter to the Division as well as to add springs 238 and 494 to the monitoring program.

Stipulation 817.52-(2)-(TM) (Cont'd.)

- b. reflect that all new source and existing baseline monitoring points for surface and groundwater monitoring shall be monitored in accord with the Division's baseline parameter list for a two year period.
3. Plateau Mining Company will by August 31, 1987, install a continuous monitoring station at Station M-8 as shown on Map 29. PMC will begin to monitor stream flow continuously and water quality monthly from August 31 1987 until October 31, 1987 weather permitting. Monitoring will be undertaken from June until October per the baseline water quality parameter list through 1988 and 1989.
4. Plateau Mining Company will amend the current PAP by August 31, 1987 to commit to carry out stream surveys equivalent to the one carried out in the NFRF Miller Creek on July 2, 1986, in July and September of every year mining occurs, including 1987, within Section 18 of the New Lands Permit Area, and until subsidence impacts have been stabilized. PMC will flag and determine the exact location of each monitoring station for the survey so the survey can be carried out at the same stations using the same monitoring methods, on a yearly basis.

Stipulation UMC 817.57-(1)-(TM)

1. Plateau Mining Company will amend the PAP by October 31, 1987 to commit to notify the Division immediately upon discovery of a crack or subsidence related impact to the NFRF Miller Creek. PMC will undertake the most appropriate approved mitigation plan to restore the integrity and flow of the NFRF Miller Creek channel and have this measure in place within seven (7) days of discovery of a crack or subsidence related impact.
2. Plateau Mining Company shall provide by October 31, 1987, for insertion into the PAP, design detail for the cutoff walls to be used in the event of a temporary diversion of North Fork of the Right Fork of Miller Creek.

Stipulation 817.71-.74-(1)-(PGL/DD/RVS)

The Plateau Mining Company shall submit by October 31, 1987, for inclusion in the PAP, an operational plan for collection and analyses of each stratum of overburden to be removed, including the stratum immediately above and below each coal seam to be mined, graben crossing waste rock, and materials presently in the refuse pile, to identify potential acid or toxic-forming, or alkalinity producing materials. The plan shall include a discussion of the potential for, and mitigation of, water quality impacts and/or revegetation problems attendant to the refuse pile. Moreover, the operator shall submit the calculated volume of waste rock to be generated during the permit term.

Stipulation UMC 817.121-1-(RVS)

1. Plateau Mining Company will provide, by August 31, 1987, a subsidence plan for monitoring vertical and horizontal movement along NFRF Miller Creek.

Stipulation UMC 817.124-1-(KMM)

1. Plateau Mining Company will, by October 31, 1987, commit to providing in the Annual Subsidence Report:
 - (A) an assessment of the impacts of cliff failure and resulting talus slope formation on vegetation and wildlife resources.
 - (B) An acceptable vegetation/mitigation plan to be implemented in the first normal season after significant subsidence and cliff failure ceases.

Stipulation UMC 817.126-1,2-(RVS)

1. Plateau Mining Company will, by October 31, 1987, commit to restricting longwall mining in panel three (Section 18) of the Wattis seam to areas of 500 or more feet of overburden. Moreover, in areas of 400 to 500 feet of overburden in Panel three (Section 18), the applicant will commit to mining by the room and pillar method with retention of pillars that are properly sized to maintain the integrity of NFRF Miller Creek.

Stipulation UMC 817.126-1,2-(RVS) Cont'd.)

2. Longwall mining and development in Panels 7 and 8 (Section 18, third panel), may not proceed until:
 - (A) PMC has identified, to the Division's satisfaction, subsidence-induced material damage associated with Wattis seam mining, and
 - (B) the Division has evaluated potential environmental degradation.

Stipulation 817.150-.176-(1)-(PGL)

Plateau Mining Company shall submit by October 31, 1987, for inclusion into the PAP, detailed descriptions and specifications for each road within the permit area to include: maintenance and reclamation details, maps showing location, and cross sections of each road in the permit area.

1260/16-21

Five Year Permit Renewal
Administrative Overview

Plateau Mining Company
Star Point Mine
ACT/007/006
Carbon County, Utah

1987

Background

The Star Point Mines are located approximately 10 miles west of Price, Utah on the east side of the Wasatch Plateau Coal Field. The permit area consists of 6,085 acres comprised of State, Federal coal leases and privately owned holdings.

The Star Point Mines were in operation prior to the enactment of SMCRA and the subsequent Utah Code Annotated (UCA) 40-10-1 et. seq. A permanent program permit was issued to Plateau Mining Company on January 27, 1982.

During the review of the recompiled five-year renewal application, it became apparent that the OSM approved permit of 1982 had not adequately addressed several items currently required under the Utah program. These items included: (a) a detailed permanent channel reclamation and restoration plan; (b) culvert sizing, inlet and outlet protection measures; (c) topsoil mass balance calculations; (d) pond inlet and outlet protection measures; (e) operational plan for sampling overburden above and below coal seams mined; (f) backfilling details and cross sections for permanent reclamation; and (g) road specifications.

Due to the scope of several of the issues, stipulations are contained in the renewal permit to rectify these items. In fact, the applicant has undertaken studies and data gathering efforts since these issues were identified to allow a timely response to stipulations during 1987.

The operator published notice for the five year permit renewal as required for four consecutive weeks ending on October 22, 1986. No comments were received.

Permit Changes

During the previous permit term numerous amendments and revisions were approved. These items have been incorporated into the recompiled five-year renewal application.

Recommendation for Approval

Approval for five year permit renewal is recommended, based on the Permit Application Package (PAP), as updated through July 29, 1987, a review of the current permit, including all conditions, amendments and revisions approved to date, and conformance with criteria for approval of permit renewal applications (UMC 788.14 - .16) (See attached Findings). The permit renewal term will not exceed the original permit term of five years.

FINDINGS DOCUMENT

Plateau Mining Company
Five-Year Renewal
Star Point Mines
ACT/007/006, Carbon County, Utah

August 5, 1987

1. The plan and the permit application are accurate and complete and all requirements of the Surface Mining Control and Reclamation Act (the "Act"), and the approved Utah State Program have been complied with (UMC 786.19[a]).
2. The applicant proposes acceptable practices for the reclamation of disturbed lands. These practices have been shown to be effective in the short-term; there are no long-term reclamation records utilizing native species in the western United States. Nevertheless, the regulatory authority has determined that reclamation, as required by the Act, can be feasibly accomplished under the Mining and Reclamation Plan (MRP) (UMC 786.19[b]).
3. The assessment of the probable cumulative impacts of all anticipated coal mining activities in the general area on the hydrologic balance has been made by the regulatory authority. The reclamation plan proposed under the application has been designed to prevent damage to the hydrologic balance in the permit area (UMC 786.19[c] and UCA 40-10-11[2][c]). (See Cumulative Hydrologic Impact Analysis (CHIA) attached to this Findings Document.)
4. The proposed permit area for the Star Point Mines is:
 - A. not included within an area designated unsuitable for underground coal mining operations;
 - B. not within an area under study for designated lands unsuitable for underground coal mining operations;
 - C. not on any lands subject to the prohibitions or limitations of 30 CFR 761.11[a] (national parks, etc.), 761.11[f] (public buildings, etc.) and 761.11[g] (cemeteries);
 - D. not within 100 feet of the outside right-of-way line of a public road (UMC 761.11);

- E. not within 300 feet of any occupied dwelling (UMC 786.19[d]). (See MRP Section 782.16.).
5. The regulatory authority's issuance of a permit is in compliance with the National Historic Preservation Act and implementing regulations (36 CFR 800) (UMC 786.19[e]). (See attached letter from State Historic Preservation Officer (SHPO) dated October 30, 1986).
 6. The applicant has the legal right to enter and complete reclamation activities in the permit area through federal coal leases SL-031286, U-7949, U-37045, U-13097, state land lease 22729 and certain fee-owned/leased parcels.
 7. The applicant has shown that prior violations of applicable laws and regulations have been corrected (UMC 785.19[g]). (Memo of May 11, 1987 from George Stone, OSMRE).
 8. Neither Plateau Mining Company nor its parent company, Cyprus Western Coal Company, are delinquent in payment of fees for the Abandoned Mine Reclamation Fund (UMC 786.19[h]). (Memo of May 11, 1987, from OSMRE, Washington, D.C.).
 9. The applicant does not control and has not controlled mining operations with a demonstrated pattern of willful violations of the Act of such nature, duration and with such resulting in irreparable damage to the environment as to indicate an intent not to comply with the provisions of the Act (UMC 786.19[i]) (Memo of May 11, 1987, from OSMRE, Washington, D. C.).
 10. Underground coal mining and reclamation operations to be performed under the permit will not be inconsistent with other operations anticipated to be performed in areas adjacent to the proposed permit area (UMC 786.19[j]).
 11. A detailed analysis of the proposed bond has been made. The bond estimate is \$3,407,322.00. The regulatory authority has made appropriate adjustments to reflect costs which would be incurred by the state, if it was required to contract the final reclamation activities for the mine site. The bond shall be posted (UMC 786.19[k]) with the regulatory authority prior to final permit issuance.
 12. No lands designated as prime farmlands or alluvial valley floors occur on the permit area (UMC 786.19[l]).

13. The proposed postmining land-use of the permit area has been approved by the regulatory authority (UMC 786.19[n]). (See TA, Section UMC 817.133.)
14. The regulatory authority has made all specific approvals required by the Act, and the Cooperative Agreement and the Federal Lands Program (UMC 786.19[n]).
15. The proposed operation will not affect the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats (UMC 785.19[o]).
16. All procedures for public participation required by the Act, and the approved Utah State Program have been complied with (UMC 786.11-.15).

Findings Specific to the Five-Year Renewal

17. The permit renewal term will not exceed the original permit term of five years (UMC 788.15).
18. The terms and conditions of the existing permit are being satisfactorily met (UMC 788.16[a][1]).
19. The present underground coal mining activities are in compliance with the environmental protection standards of the Act and the Utah Program (UMC 788.16[a][2]).
20. The requested renewal will not substantially jeopardize the operator's continuing responsibility to comply with the Act and the Utah Program (UMC 788.16[a][3]).
21. The operator has provided evidence that the performance bond will remain in full effect for the additional permit period. No additional surface disturbances requiring an increase in bond are proposed (UMC 788.12[a][4]).

Prior to the permit taking effect, the applicant must agree to comply with the special stipulations in the permit and post the performance bond for reclamation activities.

John H. Whitehead

DOGM Lead Reviewer

Lawrence P. Bradley

Administrator, Mineral Resource
Development and Reclamation Program

Kenneth E. May

Associate Director, Mining

Kenneth E. May for Diane R. Nielson

Director

PLATEAU MINING COMPANY
FIVE-YEAR PERMIT RENEWAL
CHRONOLOGY

1/21/82 OSM Approval of Plateau Mining Company's Star Point Mine

1/27/82 DOGM Approval letter for Plateau Mining Company's Star Point Mine

10/4/82 Approval issued for Emergency Lease Modification to SL-031286 (160 acres)

9/28/84 Unit Train Loadout Revision Approval (ROW U-52404)

5/2/85 Approval of Incidental Boundary Change at Unit Train Loadout

9/29/86 PMC submits recompiled, updated Five-Year Renewal Application

10/22/86 Renewal Public Notice published in local newspaper for four consecutive weeks

11/20/86 DOGM identifies deficiencies in PMC's 9/29/86 submittal

11/21/86 Public comment period closes, no comments received

1/5/87 PMC responds to 11/20/86 DOGM deficiency letter

2/9/87 DOGM letter transmits remaining deficiencies in the five-year renewal application

3/13/87 PMC responds to 2/9/87 deficiency letter

4/17/87 DOGM letter transmits remaining deficiencies to the five-year renewal application

5/8/87 PMC responds to 4/17/87 deficiency letter

5/11/87 OSMRE "510 C" Compliance clearance made

7/29/87 PMC forwards updated, complete, recompiled 5-year renewal application

8/5/87 DOGM makes necessary findings and issues permit.

1093R/17

UTAH DIVISION OF OIL, GAS AND MINING
STATE DECISION PACKAGE
PLATEAU MINING COMPANY
STAR POINT MINES
FIVE-YEAR RENEWAL/NEW LANDS ADDITION

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3. State Permit With Conditions

GENTRY MOUNTAIN
CUMULATIVE HYDROLOGIC IMPACT
ASSESSMENT

Bear Canyon Mine, ACT/015/025
Hiawatha Mines Complex, ACT/007/011
Star Point Mines, ACT/007/006
Trail Canyon Mine, ACT/015/025
Carbon County and Emery County, Utah

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I. INTRODUCTION

The purpose of this report is to provide a Cumulative Hydrologic Impact Assessment (CHIA) for Gentry Mountain located in Carbon and Emery counties, Utah. This assessment encompasses the probable cumulative impacts of all anticipated coal mining in the general area on the hydrologic balance and whether the operations proposed under the application have been designed to prevent damage to the hydrologic balance outside the proposed mine plan area. This report complies with legislation passed under Utah Code Annotated 40-10-1 et seq. and the attendant State Program rules under UMC 786.19(c).

Gentry Mountain occurs within the Wasatch Plateau Coal Field approximately 10 miles southwest of Price, Utah (Figure 1). The eastern margin of the Wasatch Plateau forms a rugged escarpment that overlooks Castle Valley and the San Rafael Swell to the east. Elevations along the eastern escarpment of the Wasatch Plateau range from approximately 6,500 to over 9,000 feet.

Precipitation varies from 40 inches at higher elevations to less than 10 inches at lower elevations. The area encompassed by the Wasatch Plateau may be classified as semiarid to subhumid.

GEOLOGY

Outcropping rocks of the Wasatch Plateau Coal Field range from Upper Cretaceous to Quarternary in age. The rock record reflects an overall regressive sequence from marine (Mancos Shale) through littoral (Star Point Sandstone) and lagoonal (Blackhawk Formation) to fluvial (Castlegate Sandstone, Price River Formation and North Horn Formation) and lacustrine (Flagstaff Limestone) depositional environments. Oscillating depositional environments within the overall regressive trend are represented by lithologies within the Blackhawk Formation. The major coal-bearing unit within the Wasatch Plateau Coal Field is the Blackhawk Formation.

VEGETATION

Vegetation of the Wasatch Plateau area is classified within the Colorado Plateau Floristic Division (Cronquist et al., 1972). The area occupies parts of both the Utah Plateaus and the Canyon Lands Floristic Sections. Vegetation communities of the area include Desert Shrub (Shadscale) at the lowest elevations through Sagebrush, Sagebrush-Grassland, Pinyon-Juniper, Mountain Brush, Douglas Fir-White Fir-Blue Spruce and Englemann Spruce-Subalpine Fir.

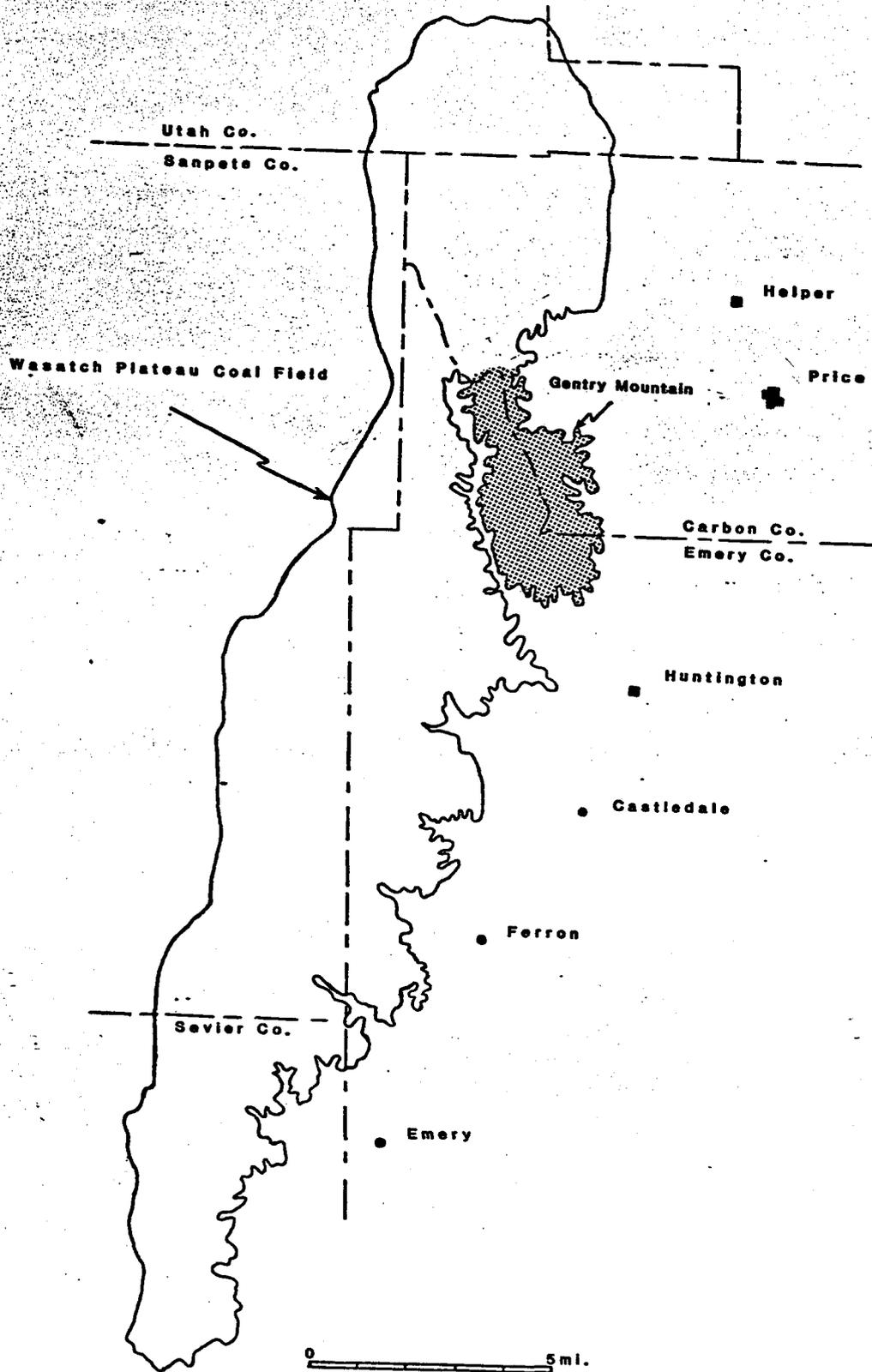


Figure 1. Wasatch Plateau Coal Field.

Desert Shrub communities are sparsely vegetated shrublands that, depending on elevation and soils, may be dominated by Shadscale (Atriplex confertifolia), Fourwing saltbush (A. canescens), Castle Valley clover (A. nuttallii) or Mat saltbush (A. corrugata) and can include Winter fat (Ceratoides lanata), Mormon tea (Ephedra spp.), Budsage (Artemisia spinescens), miscellaneous buckwheats (Erigonum spp.), Indian ricegrass (Oryzopsis hymenoides), Galleta grass (Hilaria jamesii), Grama grass (Bouteloua spp.), Needle and thread grass (Stipa comata), Sand dropseed (Sporobolus airoides) and Squirrel tail (Sitania hystrix). Greasewood (Sarcobatus vermiculatus) - Saltgrass (Distichlis stricta) can dominate bottomlands.

Many Sagebrush communities of the area are relatively dense shrub stands of (Artemisia tridentata var tridentata) with very little understory growth. In relatively undisturbed Sagebrush communities, Rabbitbrush (Chrysothamnus nauseosus or C. viscidiflorus), Mormon tea, and several perennial grasses including Thickspike and Western wheatgrass (Agropyron dasystachyum and A. smithii), Great Basin wildrye (Elymus cinereus), Indian ricegrass and Dropseed species may be common.

In the Sagebrush-Grassland type, the typical Big sage may give way to Artemisia tridentata var vaseyana (Mountain big sage) with a co-dominant perennial grass understory. Salina wildrye (Elymus salinus) can be co-dominant in these communities and may dominate an herbaceous Grassland type. Black sage (A. nova) with Salina Wildrye or Western wheatgrass understory is also common.

Pinyon-Juniper woodlands occupy drier sites often with stoney to very rocky soils. Pinus edulis and Juniperus osteoperma are co-dominant in the overstory. Understory vegetation ranges from sparse to moderate ground cover on range sites in poor to excellent condition. Understory species include Sagebrush, Mountain mahogany (Cercocarpus montanus), Snowberry (Symphoricarpus oreophilus), and several perennial grasses including Slender wheatgrass (Agropyron trachycaulum), Salina wildrye, Junegrass (Koeleria cristata) and Indian ricegrass.

Dominant shrubs of the Mountain Brush communities will vary depending on elevation and aspect. The drier south and west facing slopes may support dense stands of Gambel's oak (Quercus gambellii). Other dominants of this community may include Serviceberry (Amelanchier utahensis), Mountain mahogany (Cercocarpus montanus or C. ledifolius), Bitterbrush (Purshia tridentata) and Snowberry.

The range of the Douglas Fir-White Fir-Blue Spruce community is about 8,000 to 10,000 feet. Douglas Fir (Pseudotsuga mensiesii) is usually the dominant tree with White Fir (Abies concolor) and Blue

Spruce (Picea pungens) usually limited to the most mesic sites, often along streams. With dense canopies, understory vegetation may be sparse. Common shrubs include Serviceberry (Amelanchier spp.), Oregon grape (Berberis repens), Chokecherry (Prunus virginiana), Rocky Mountain Maple (Acre glabrum), Mountain lover (Pachistima myrsinites) and Snowberry. Bluebunch wheatgrass (Agropyron spicatum), Mountain brome (Bromus marginatus), and Kentucky bluegrass (Poa pratensis) are common grasses. Aspen stands (Populus tremuloides) can be found throughout the zone, particularly in mesic sites and as successional communities.

Picea engelmannii and Abies lasiocarpa dominate the Spruce-Fir zone at the highest elevations of the hydrologic impact area. While receiving about the same precipitation as the Douglas Fir communities, lower evapo-transpiration with cooler temperatures can permit a more lush vegetation in the Spruce-Fir zone. Limber pine (Pinus flexilis) often occupies steep or rocky, drier sites of this zone.

Small riparian communities are found at all elevations within the impact assessment area. With greater water availability and cooler temperatures, the riparian zone often includes more mesic species, e.g., those from a higher vegetation zone. Shrub species from the Mountain Shrub type may be found at most elevations.

Additional riparian zone shrubs include Narrowleaf cottonwood (Populus angustifolia), Redosier dogwood (Cornus stolonifera), Skunk bush (Rhus trilobata), river birch (Betula occidentalis) and various willows (Salix spp.). Grass species from the mesic zones may be represented (Mountain Shrub and higher zones) along with fescues (Festuca spp.) and miscellaneous sedges (Carex spp.). Small wet areas around springs and seeps will often support a dense growth of grasses, sedges and willows.

HYDROLOGY

Surface runoff from the Wasatch Plateau area flows either to the Price River Basin or the San Rafael River Basin. The Price River Basin, which includes about 1,800 square miles in six counties, is located primarily in Carbon and Emery Counties in East-Central Utah. The San Rafael River Basin, which includes about 2,300 square miles in three counties, is located mainly in Emery County to the south of the Price River Basin. The Price River drainage originates in the Wasatch Plateau about 12 miles west and south of Scofield Reservoir. Downstream from the reservoir the river flows in a generally southeasterly direction. The drainage is bounded by the Book Cliffs on the northeast, the Wasatch Plateau on the west, and the San Rafael Swell on the south. The San Rafael River Basin occupies part of two physiographic sections of the Colorado Plateau

- The High Plateaus to the north and west and Canyonlands to the south and east (Fenneman, 1946). Principal streams in the basin are Huntington and Cottonwood creeks, which merge to form the San Rafael River, and Ferron Creek, which joins the San Rafael River within a mile of that confluence. The San Rafael River also flows in a southeasterly direction to eventually join the Green River, after travelling from its headwaters in the Wasatch Plateau.

The water quality of both the Price River and the San Rafael Rivers is good in the mountainous headwater tributaries, but deteriorates rapidly as flow traverses the Mancos Shale. The shale lithology typically has low permeability, is easily eroded and contains large quantities of soluble salts that are major contributors to poor water quality. Depending upon the duration of contact, water quality degrades downstream to where Total Dissolved Solids (TDS) levels of 4,000 milligrams per liter (mg/l) are not uncommon. The predominant ion leached from the Mancos Shale is sulfate (SO₄) with values over 1,000 mg/l common in the lower reaches of the Price River.

Ground water is present in all lithostratigraphic units within the Wasatch Plateau Coal Field. Ground water occurs under localized conditions that often form a system of "perched" aquifers and associated springs and/or seeps. Significant localized ground-water resources are associated with the North Horn Formation and Price River Formation. The U.S. Geological Survey has identified and formally designated the Star Point-Blackhawk aquifer as the only regional ground-water resource occurring in the Wasatch Plateau Coal Field (Danielson, et al., 1981 and Lines, 1984).

II. CUMULATIVE IMPACT AREA (CIA)

Figure 2 delineates the CIA for current and projected mining in the Gentry Mountain area. The CIA encompasses approximately 112 square miles and includes Gentry Mountain, Wild Cattle Ridge and Star Point. The western and northern CIA boundaries are designated by drainages and drainage divides, whereas the southern and eastern boundaries are defined by T16S/T17S and R8E/R9E SLBM, respectively.

III. SCOPE OF MINING

STAR POINT MINES (PLATEAU MINING COMPANY)

The Plateau Mining Company permit area encompasses approximately 7,000 acres. There are three federal coal leases that are designated by the Bureau of Land Management as "Logical Mining Units" (LMUs): U-13097, SL-031286, and U-037045.

Mining operations began in 1916 when the Wattis Brothers and Mr. Browning bought 160 acres from the United States and developed the property for coal production. Coal was shipped in the autumn of 1917 when the railroad was completed, to the town of Wattis. The Lion Coal Company bought the coal interests in 1919. In 1967 Plateau Limited opened a new mine in the Hiawatha Seam. In 1971 United Nuclear purchased the mine and in July 1980 Plateau Mining Company bought the properties.

Historically, the Star Point #2 Mine (where mining has ceased) developed coal resources in the Hiawatha, Third, and Wattis seams by the room and pillar technique. During the permit term of 1987-1992, mining will occur in the Wattis and Third seams and development work is projected for the Hiawatha seam in the Star Point #1 Mine. Subsequent permit terms will involve further mining in all three of the coal seams through the year 2010. There will be room and pillar mining and longwall mining in the Wattis and Third seams and longwall mining in the Hiawatha seam.

There are certain areas where the cumulative effects of multiple seam mining will be experienced. The area of T15S R7E, Section 12, will have combined subsidence effects, and potentially, Section 18 of T15S R8E.

HIAWATHA MINES COMPLEX (U.S. FUELS COMPANY)

The Hiawatha Mines Complex permit area encompasses about 12,000 acres and is located adjacent to the Plateau Mining Company permit area. The Federal coal leases currently designated as LMUs are SL-025431 and U-026583. A large portion of the remainder of the coal is owned by U.S. Fuels. Coal is projected to be mined until the year 2014.

The Hiawatha Mines Complex is a consolidation of the original King, Hiawatha, Black Hawk, and Mohrland coal mines which began operating in the early 1900's. U.S. Fuels Company was organized in 1915 and began operating in 1916, when it took over the properties of the Consolidation Fuel Company, Castle Valley Coal Company, and Black Hawk Coal Company, all of which were located within the current permit boundary.

Mining has occurred throughout large portions of the permit area by the room and pillar technique: King 4 (A & B Seams), King 5 (B Seam), King 6 (A & Hiawatha Seams), King 7 (Hiawatha Seam), and King 8 (Upper Seam). Future longwall mining will be undertaken in the King 5 (A Seam) and King 8 (Upper Seam).

BEAR CANYON AND TRAIL CANYON MINES (CO-OP MINING COMPANY)

Co-Op Mining Company owns two mines located south of the Plateau Mining Company and Hiawatha Mines Complex permit areas.

The Bear Canyon Mine encompasses 991 acres. Mining during the first five-year permit term will occur in the Bear Canyon coal seam and thereafter, in the Hiawatha seam. There are two federal coal leases designated as LMUs at the Bear Canyon Mine, U-024316 and U-024318. Production will be from room and pillar mining methods with secondary pillaring.

The Trail Canyon Mine, located immediately west of the Bear Canyon property, has been operated by Co-Op Mining Company since 1938. Production to date has been from the Bear Canyon coal seam. The Trail Canyon Mine was declared suspended during 1983 and will be reclaimed.

IV. STUDY AREA

GEOLOGY

The Gentry Mountain CIA is characterized by cliffs, narrow canyons and pediments. Stratigraphic units outcropping within the area include, from oldest to youngest, the Mancos Shale, Starpoint Sandstone, Blackhawk Formation, Castlegate Sandstone, Price River Formation, North Horn Formation, Flagstaff Formation and Quarternary deposits. Lithologic descriptions and unit thicknesses are given in Figure 3.

Rocks in the study area strike northwest and dip approximately three degrees to the southeast. Four major normal faults or fault zones (Pleasant Valley Fault, Trail Canyon Fault, unnamed fault, Bear Canyon Fault) trend north in the western portion of the CIA (Figure 4). Displacements range from several feet to approximately 800 feet.

HYDROLOGIC RESOURCES

Ground water

The ground-water regime within the CIA is dependent upon climatic and geologic parameters that establish systems of recharge, movement and discharge.

Snowmelt at higher elevations provides most of the ground-water recharge, particularly where permeable lithologies such as fractured or solution limestone are exposed at the surface. Vertical migration of ground water occurs through permeable rock units and/or along zones of faulting and fracturing. Lateral migration initiates

System	Series	Stratigraphic Unit	Thickness (feet)	Lithology and Water-Bearing Characteristics
Quaternary	Holocene and Pleistocene	Quaternary deposits	0-100	Alluvial and colluvium; clay, silt, sand, gravel, and boulders; yields water to springs that may cease to flow in late summer.
Tertiary	Paleocene	North Horn Formation	300 ±	Varigated shale and mudstone with interbeds of tan-to-gray sandstone; all of fluvial and lacustrine origin; yields water to springs.
Cretaceous	Upper Cretaceous	Price River Formation	200-250	Gray-to-brown, fine-to-coarse, and conglomeratic fluvial sandstone with thin beds of gray shale; yields water to springs locally.
		Castlegate Sandstone	150-200	Tan-to-brown fluvial sandstone and conglomerate; forms cliffs in most exposures; yields water to springs locally.
		Blackhawk Formation	1000 ±	Tan-to-gray discontinuous sandstone and gray carbonaceous shales with coal beds; all of marginal marine and paludal origin; locally scour-and-fill deposits of fluvial sandstone within less permeable sediments; yields water to springs and coal mines, mainly where fractured or jointed.
		Star Point Sandstone	350-450	Light-gray, white, massive, and thin beaded sandstone, grading downward from a massive cliff-forming unit at the top to thin interbedded sandstone and shale at the base; all of marginal marine and marine origin; yields water to springs and mines where fractured and jointed.
		Mancos Shale	1000 ±	Dark-gray marine shale with thin, discontinuous layers of gray limestone and sandstone; yields water to springs locally.

Figure 3. Stratigraphy of the Gentry Mountain Area (modified from Plateau Mining Company PAP, 1986, and Danielson, et al., 1981).

when ground water encounters impermeable rocks and continues until either the land surface is intersected (and spring discharge occurs) or other permeable lithologies or zones are encountered that allow further vertical flow.

The Star Point Sandstone and lower portion of the Blackhawk Formation, Castlegate Sandstone, Price River Formation, North Horn Formation, Flagstaff Limestone, and Quarternary deposits are potential reservoirs or conduits for ground water in the CIA. Reservoir lithologies are predominantly sandstone and limestone. Sandstone reservoirs occur as channel and overbank, lenticular and tabular deposits, whereas limestone reservoirs have developed through solution processes and fracturing. Shale, siltstone and cemented sandstone beds act as aquacludes to impede ground-water movement. The Mancos Shale is considered a regional aquaclude that delimits downward flow within the CIA. Localized aquacludes include relatively thin, impermeable lithologies occurring within the stratigraphic section above the Star Point Sandstone.

The Star Point-Blackhawk aquifer is present and represents the only identified regional ground-water resource in the study area (Danielson, et al., 1981). Ground water associated with the Price River Formation and North Horn Formation may be characterized as occurring within an extensive "perched" aquifer zone and represents a significant hydrologic resource.

Faults and fractures act as effective conduits for ground water and allow unsaturated downward flow. Springs having significant discharges (10 gpm or greater) are most commonly located in proximity to major north-south trending fault or fracture zones (Figure 4). In particular, Bear Canyon Fault appears to act as a significant conduit for ground water. Mine workings contact with the Bear Canyon Fault at the 10th West Section in U.S. Fuels' King IV Mine has resulted in a sustained inflow of 900 to 1,000 gpm.

Other encounters with the Bear Canyon Fault in Plateau Mining Company's Star Point No. 1 Mine resulted in an initial high inflow rate that subsequently diminished. Three municipal wells (Huntington) have been developed adjacent to the Trail Canyon Fault near the junction of Wild Cattle Hollow and Gentry Hollow (Figure 4).

Data from seven boreholes located within and adjacent to the Star Point Mines permit area indicate ground water associated with the regional aquifer moves toward the south (Figure 4).

Approximately 325 seeps and springs occur within the CIA. Total spring discharge exceeds 1500 gpm. One hundred eighty-nine springs discharge from the North Horn Formation and Price River Formation (1,200 gpm); 37 springs discharge from the Castlegate Sandstone (80 gpm); 53 springs discharge from the Blackhawk

Formation and Star Point Sandstone (200 gpm); and eight springs discharge from the Mancos Shale (40 gpm). Analyses from spring samples indicate water quality progressively decreases from the North Horn Formation to the Mancos Shale.

Mine inflow is estimated to be 134 gpm in the Star Point Mines, 950 gpm in the Hiawatha Mines Complex, and less than 50 gpm in the Trail Canyon Mine and Bear Canyon Mine. The majority of mine inflow (80 percent) is from faults and fractures with a lesser amount from paleochannels and wall weeps. Mine inflow is discharged to Mud Water Canyon at Star Point Mines and to Cedar Creek and Miller Creek at the Hiawatha Mines Complex. Mine inflow is not discharged at Bear Canyon Mine or Trail Canyon Mine. Mine water within the CIA represents ground-water depletion from storage in the Blackhawk Formation and Star Point Sandstone and the interception of flow along faults/fractures.

Surface Water

The CIA has been divided into six major drainage basins representing seventeen sub-drainage areas. The CIA encompasses drainage to both the San Rafael and Price River Basins (see Figure 5 and Table 1).

1. Serviceberry Creek Drainage

The Serviceberry Creek Drainage (1) includes the majority of disturbed area associated with the Plateau Mine. The mine exists in the headwaters of this creek drainage area of 6,135 acres. The average gradient of the creek within the CIA is 21 percent. Serviceberry Creek (1) is ephemeral within the CIA and eventually joins Miller Creek (16), east of the CIA, which is a perennial creek.

Vegetation communities in this drainage system include Douglas Fir-White Fir, Aspen, Mountain Brush, Sagebrush, including both Black sage and Big sage associations, Mixed Grass - Forb communities, and Pinyon - Juniper Woodlands. Riparian communities are generally small and may be dominated by willows, River birch or an occasional Cottonwood. Desert Shrub communities, particularly Shadscale, occupy the lowest elevations in the eastern section of the drainage system.

Mining has been confined to the extreme upper reaches of the watershed. The approximately 330 acres of surface disturbance associated with the surface facilities of the Plateau Mine has also been confined to the upper reaches of this watershed. All of Plateau's surface disturbance is treated by maintained sediment controls.

2, 3. Mud Water Canyon Drainage

Approximately 2978 acres drains Mud Water (2) and Los Angeles Canyon (2) to join 7080 acres draining Seely, Corner, and First Water canyons (3) to form Gordon Creek of the Price River Basin. The average gradient in the headwaters of these drainages is 19 percent. Mining has occurred within the extreme headwater reaches of Mud Water (2), Los Angeles (2), and Seely canyons (3), and the South Fork of Corner Canyon (3). Presently, Mud Water, Seely and the South Fork of Corner Canyon are perennial in their lower reaches, sustained by high elevation spring flow and mine water discharge (Mud Water Canyon).

Vegetation communities of the Mud Water Canyon Drainage area include Spruce-Fir, Douglas Fir-White Fir, Aspen, Mountain Brush, Sagebrush, including both Big sage and Black sage associations, Mixed Grass - Forb communities and shrub and grass-forb dominated riparian communities on the headwater streams.

Mining has not occurred beneath any stream channels, but has been restricted to the ridges separating the drainages.

4, 5, 6, 7 & 8 Gentry Ridge Drainage

Approximately 7,777 acres drain Wild Cattle Hollow (6) and Gentry Hollow (7) to form Tie Fork Canyon (8) tributary to Huntington Creek. Approximately 5516 acres drains areas directly tributary to Huntington Creek on Nuck Woodward Canyon (4). The average gradient of Gentry (7) and Wild Cattle Hollow (6) is 13 percent. Tie Fork Canyon's gradient is 44 percent. Miscellaneous side tributaries to Huntington Creek (Pole Canyon, McElprang Canyon, Vicks Canyon, Grange Hole, Biddlecome Hollow) (5) have average gradients of 40-50 percent.

All of the ephemeral drainages are not within the range of current underground mining plans. Portions of the Gentry Hollow (7) and Wild Cattle Hollow (6) drainage areas will be mined under within current mining sequences. Portions of the Gentry Hollow drainage area have been mined under by the Hiawatha Mine. Wild Cattle Hollow's main channel will not be mined under but longwall panels of the current Plateau Mine sequence will abut the channel as the mine progresses in a southwesterly direction. Both Gentry Hollow and Wild Cattle Hollow are designated perennial creeks on the U.S. Geological Survey quadrangle map.

Vegetation communities of the Gentry Ridge Drainage area include Spruce-Fir, Douglas Fir-White Fir, Aspen, Mountain Brush, Sagebrush, including both Big sage and Black sage associations, Mixed Grass - Forb communities and a variety of riparian communities.

The latter range from Cottonwood dominated associations along Huntington Creek to narrow bands of dense fir in the bottoms of steep canyons.

9, 10, 11, 12 & 13 Bear Creek - Trail Creek Drainage

Approximately 8,620 acres of drainage contribute to Trail Canyon (9), Bear Canyon (10), and three miscellaneous tributaries to Huntington Creek (11,12,13). The average gradient of Trail and Bear Canyon is approximately 20-25 percent. The average gradient of the miscellaneous tributaries ranges from 40 to 70 percent.

Bear Creek (10) is characterized by steep gradients, narrow canyons, and large sediment loads (28,092 mg/l Total Suspended Sediments (TSS) measured during a major storm event). Trail Creek (9) is characterized by steep gradients, narrow canyons, and good water quality. Mining occurs above Trail Creek.

About 10 acres of mine surface disturbance occurs in both Bear and Trail canyons. An additional 3 acres are associated with the living quarters and surface facilities of Co-Op Mining Company. The Trail Canyon Mine is currently in the process of being permitted for reclamation. No future disturbance is planned for either mine, other than reclamation of the Trail Canyon site.

Vegetation communities in this drainage system include Spruce-Fir, Douglas Fir-White Fir, Aspen, Mountain Brush, Sagebrush, dominated by Black sage associations, Mixed Grass - Forb communities with Salina wildrye and Bluebunch wheatgrass dominants, Pinyon - Juniper Woodlands and a variety of riparian communities including the Huntington and Trail Creek Narrowleaf Cottonwood and willow associations.

(14, 15) Cedar Creek - Fish Creek Drainage

Approximately 19,289 acres drain both the Cedar Creek (15) and Fish Creek (14) drainage areas. The average gradient of Fish Creek is 19 percent and the average gradient of Cedar Creek is 13 percent. Both Cedar Creek and Fish Creek are ephemeral drainages with Cedar Creek exhibiting perennial characteristics in certain reaches due to mine water discharge and spring flow. The Hiawatha Mines Complex permit area encompasses portions of the Right and Left of Cedar Creek. The Right Fork is ephemeral and the Left Fork exhibits perennial characteristics in certain reaches.

Vegetation communities in this drainage system include Spruce-Fir, Douglas Fir-White Fir, Aspen, Mountain Brush, Sagebrush, including both Black sage and Big sage associations, Mixed Grass - Forb communities, Pinyon - Juniper Woodlands, riparian communities

which include Narrowleaf cottonwood, Sandbar willow (Salix exigua) and River birch (Betula occidentalis), and Desert Shrub communities at the lowest elevations in the southeastern section of the drainage system.

Surface facilities associated with the Mohrland Mine of U.S. Fuels Company are adjacent to Cedar Creek, and a major mine discharge of 500-1000 gpm occurs at the low point of the Mohrland Mine. Surface facilities disturb less than 25 acres of this drainage area.

(16, 17) Miller Creek - Sand Wash Drainage

Miller Creek (16) and Sand Wash (17) encompass 18,053 acres of the CIA drainage area. Miller Creek has an average gradient of 15 percent and the Sand Wash has an average gradient of 17 percent. The upper reaches of Sand Wash and the Right and Left Forks of Miller Creek contain approximately 350 acres of the surface facilities disturbance of the Hiawatha Mines. These include permanent diversion of a portion of Miller Creek to accommodate the coal processing waste pile. Miller Creek has been mined under by the Hiawatha Mines Complex. Plateau Mining Company will mine under the upper reaches of the North Fork of the Right Fork of (NFRF) Miller Creek. NFRF is perennial and therefore, the North Fork of Miller Creek is also a perennial stream, whereas the Middle Fork and Left Fork of Miller Creek are ephemeral.

Vegetation communities in this drainage system include Spruce-Fir, Douglas Fir-White Fir, Aspen, Mountain Brush, Sagebrush, including both Black sage and Big sage associations, Mixed Grass - Forb communities, and Pinyon - Juniper Woodlands. Riparian communities are generally narrow bands at the edge of intermittent and perennial streams or springs and may be dominated by willows, River birch or an occasional Cottonwood. Riparian zones of the headwaters may be distinguished from the uplands primarily by density and vigor of vegetation. Desert Shrub communities, particularly Shadscale with Slender wheatgrass, occupy the lowest elevations in the southeastern section of the drainage system.

V. POTENTIAL IMPACTS

GROUND WATER

Dewatering and subsidence related to mining have the greatest potential for impacting ground-water resources in the CIA. The impact of changes in vegetation on ground-water recharge should be minimal since mining will disturb less than 1000 acres of the 70,000 acre CIA. Disturbance of phreatophytic vegetation (primarily cottonwoods and some willow) is negligible. The impacts of coal waste disposal on water quality are discussed in the surface water section.

Dewatering. The volume of water being discharged from mines within the CIA (1,200 gpm) approximates the amount of water that is currently being withdrawn from the ground-water system. The current and projected withdrawal values may be totalled and compared to estimates of ground-water discharge and recharge within the CIA and thereby, allow an assessment of cumulative dewatering impacts.

Approximately 37,000 acres within the CIA overlie the coal resource and represent a potential recharge area (Figure 6). Average annual precipitation is approximately 20 inches over the potential recharge area and hence, the total annual precipitation over the outcropping recharge area is 64,000 acre-feet.

Table 2A gives estimates for the total annual discharge of springs from water-bearing rock units that overlie the coal resource. Discharge also occurs directly to perennial streams where channels intersect ground water within the Blackhawk Formation and Star Point Sandstone. Table 1 identifies the ten perennial streams that occur within the CIA. Nine of these streams intersect the lower Blackhawk Formation and Star Point Sandstone. A study conducted along the NFRF Miller Creek (16) indicates streamflow substantially increased (from 8 to 115 gpm) as a result of discharge from the Blackhawk Formation and Star Point Sandstone (Plateau Mining Company PAP, page 783-40). The results from the Miller Creek study suggest the other eight perennial streams that traverse the regional aquifer also sustain ground-water discharge (or base flow recharge). Accordingly, total base flow recharge to perennial streams within the CIA is estimated to be 900 gpm.

Table 2A. Precipitation and Spring Discharge Estimates for Areas above the Coal Resource, Gentry Mountain, CIA.

Lithologic Unit(s)	Outcrop Area (Acres)	Normal Annual Precipitation on Outcrop (Acre-Feet)	Total Annual Discharge of Springs	
			Acre Feet	Percent of Normal Annual Precipitation on Outcrop
Undivided Flagstaff Limestone, North Horn Formation, Price River Formation	19,500	34,125	1,900	.05
Castlegate Sandstone	3,000	5,250	129	.02
Blackhawk Formation, Star Point Sandstone	<u>14,900</u>	<u>26,075</u>	<u>322</u>	<u>.01</u>
TOTAL	37,400	64,450	2,351	.04

Table 2B. Estimated Ground-water Discharges to Perennial Streams and Wells and from Mines, Gentry Mountain, CIA.

Discharge to Perennial Streams (9 total)	900 gpm
Discharge to Huntington Municipal Wells (3 total)	100 gpm
Discharge from mines (2 total)	<u>1,200 gpm</u>
TOTAL	2,200 gpm

Table 2C. Approximate Atmospheric Discharges from Active Mines, Gentry Mountain, CIA.

<u>Mine(s)</u>	<u>Ventilation Rate (cfm)</u>	<u>Approximate Discharge Rate (gpm)</u>
Bear Canyon	150,000	10
Star Point Mines	650,000	44
Hiawatha Mine Complex	<u>350,000</u>	<u>24</u>
TOTAL	1,150,000	88 gpm

Table 2B lists estimated ground-water discharges to perennial streams and wells and from mines. Table 2C approximates the amount of ground water discharged to the atmosphere by mine ventilation systems. Psychrometric formulas were utilized to derive ventilation discharge values and extrapolated to the mine elevations. Average relative humidity data from the Central Weather Station in the Manti-LaSal National Forest were also used in the psychrometric calculations.

Total ground-water discharge within the CIA (summed from Tables 2A, 2B, and 2C) is currently about 3,800 gpm, where 63 percent (2,400 gpm) of the total represents natural discharge to stream and springs and 34 percent (1,500 gpm) results from mining activities. The remaining 3 percent (100 gpm) may be attributed to well discharge.

Lines (1985) investigated the Trail Mountain area and indicated regional aquifer inflow to mines is derived from aquifer storage (80 percent) and aquifer discharge (20 percent). Extrapolating these percentages to the Gentry Mountain CIA (16 miles) allows depletion, due to present mining activities (7,200 acres mined) of regional aquifer storage and discharge to be estimated at 360 and 90 gpm, respectively. Assuming future mining encompasses 3,300 acres and will continue to encounter steady-state inflow from the regional aquifer, then depletion would increase to 471 gpm for storage and 118 gpm for discharge.

The Hiawatha Mines Complex has encountered major ground-water inflow associated with the Bear Canyon Fault. Diversion of flow from this conduit has altered and will continue to alter (deplete up to 1,000 gpm) recharge to the regional aquifer and, possibly, surface discharge in the Gentry Hollow area. Future development in the Hiawatha Mines Complex will retain a barrier pillar adjacent to the Bear Canyon Fault. Plateau Mining Company has proposed to access coal reserves beneath Gentry Ridge by driving a rock tunnel across the Bear Canyon Graben and associated western (unnamed) and eastern (Bear Canyon) boundary faults. Previous encounters with the Bear Canyon Fault (eastern) in the Star Point Mines have resulted in limited inflow. Data are not available to assess whether the western (unnamed) boundary fault acts as a significant groundwater conduit. A pressure grouting program will be initiated if the tunnel encounters inflow(s) that exceed 50 gpm for more than three months. Thus, tunnel development may result in a maximum diversion of flow from the two Bear Canyon boundary faults that will not exceed a total of 100 gpm.

Future mining-induced dewatering is projected to encompass 141 gpm and hence, the cumulative dewatering total would be approximately 1,650 gpm. Following the cessation of mining, the discharge of ground water to Mud Water Canyon (2), Cedar Creek (15), Miller Creek (16), and the atmosphere, will cease and workings will begin to flood.

The impact associated with the reduction in surface flow is considered temporary. Mine flooding will conceivably recharge regional aquifer storage and re-establish the natural ground-water conduit system that was operational prior to mining. The maximum time span required for complete mine flooding may be derived by assuming the final workings (10,500 acres) will remain open (average 5 foot height) and caving will not occur. Accordingly, for workings that experience inflow (Hiawatha Mines Complex, Bear Canyon Mine, Trail Canyon Mine, Star Point Mines) an upper limit of 20 years may be derived for complete mine flooding. It should be noted that complete flooding will, undoubtedly, never be achieved because the hydraulic head generated as flooding proceeds will increase until the hydraulic properties of the roof, floor and rib are exceeded and flow within the rocks initiates.

Subsidence. Subsidence impacts are largely related to extension and expansion of the existing fracture system and upward propagation of new fractures. Inasmuch as vertical and lateral migration of water appears to be partially controlled by fracture conduits, readjustment or realignment in the conduit system will inevitably produce changes in the configuration of ground-water flow. Potential changes include increased flow rates along fractures that have "opened", and diverting flow along new fractures or within permeable lithologies. Subsurface flow diversion may

cause the depletion of water in certain localized aquifers and potential loss of flow to springs that will be undermined. Increased flow rates along fractures would reduce ground-water residence time and potentially improve water quality.

Mining will occur beneath approximately 80 springs that have a combined flow in excess of 400 gpm. Overburden thickness averages more than 1000 feet beneath areas where springs are located. Diversion of spring flow is considered to be at overall low risk.

Mining will occur beneath a portion of NFRF Miller Creek where overburden thickness ranges from 500 to 825 feet. The risk for development of tension cracks within the stream channel is considered to be moderately high.

SURFACE WATER

The cumulative impacts associated with mining within the CIA will be summarized by individually discussing impacts associated with the Star Point Mines, Hiawatha Mines Complex and Bear Canyon Mine and Trail Canyon Mine. Creeks or drainage areas which are referenced by (#) or discussed, are shown on Figure 5, Surface Water Drainage Map.

Star Point Mines. The Plateau Mining Company's surface facilities are primarily found in Sage Brush Canyon tributary to Serviceberry Canyon (1). Sage Brush Canyon and Serviceberry Canyon flow only in response to storm events.

The coal processing waste pile (Figure 4) at the Star Point Mines is at 7,400 foot elevation, annual precipitation is 12 inches, and the vegetation surrounding the waste pile are salt desert shrub and pinyon-juniper-sagebrush communities. The waste pile is not adjacent to any perennial streams or known ground-water resources. The mine presently produces 1.2 million tons of coal annually with a capacity of four million tons. Twenty percent of the material mined is processing waste.

Table 64 of the PAP indicates waste materials are sandy or coarse in nature, with a high organic matter content and have a relatively high cation exchange capacity for coarse textured materials. To date, six waste samples have been analyzed for acid-base potential. One sample had a potential to be acid-forming. The other samples tested had excess base, which should be sufficient to neutralize drainage or seepage from areas which could potentially form acid. The alluvium which underlies the coal waste is calcareous and will also neutralize any acid drainage from the refuse.

Selenium was the only parameter tested for in the waste which had concentrations above suspect levels. This suspect concentration is .1mg/kg and is for toxicities which may occur to animals feeding on vegetation grown on this material. The suspect value which may be detrimental to water quality is not known. Selenium in the coal waste should not be a concern to water quality because drainage from the pile should be minor. The waste, although hauled to the pile in a wet form is not a slurry, and most of the water associated with the waste evaporates in the dry climate of the area.

Data given in Table 64 indicate waste could contribute slightly to increasing TDS levels in surface or ground water. The electrical conductivities of four samples were saline (greater than 4mmhos/cm²).

Although most water associated with the waste will evaporate, some water will inevitably percolate through the pile and underlying alluvial deposits. Eventually, seepage would contact the Mancos Shale and further degradation of water quality would take place. Accordingly, drainage from the waste pile would have little down gradient effect.

All surface water drainage is treated by running disturbed area drainage through sediment ponds. There are no water rights within or adjacent to the mine plan area that could be impacted by operation of surface treatment facilities. Runoff conveyance systems and treatment facilities have been designed to minimize the amount of area that is tributary to the sediment ponds. The quantity of runoff detained by sediment ponds is minimized by diversion of undisturbed waters (PAP, page 784-62).

The Plateau treatment facilities have operated in compliance with all NPDES discharge limitations except for TDS exceedence at the Mud Water Canyon Mine Water and Sediment Pond No. 8. Requests for modifications to the limits currently in effect has been made for these facilities but not yet granted by State Health and EPA. The current TDS limitation for the Mud Water Canyon (2) discharge is 650 mg/l TDS. The request to raise this limit to 1,450 mg/l (an average of the naturally occurring concentration of the Mud Water Canyon stream) has been made. The average annual flow for the period of 4/85 through 3/86 is approximately 129 gpm to Mud Water Canyon, associated with the Mine Water Discharge (PAP, page 783-46). Of 15 TDS samples taken from the Mud Water Canyon discharge in 1985, the TDS concentration varied from a low of 598 mg/l taken in late May to a high of 772 mg/l taken in late October. The sample mean was 689 mg/l with a standard deviation of 53 mg/l. TDS effluent concentrations at Pond No. 8 have been recorded as high as 3,913 mg/l on March 10, 1986. An undisturbed area sample taken on the same day near Pond No. 8 discharge was 6,024.0 mg/l. Plateau Mining Company is in the process of monitoring inflows to Pond No. 8 for a one-year period (PAP, page 784-79).

The effects of the discharge associated with Plateau Mining Company's mine water result in approximately 485.62 Tons/Yr of dissolved solids being added to the surface water system tributary to the Price River and to the Colorado River. This is based on average data for the period of 1/22/86 through 12/18/86 taken from the mine water discharge point.

Of the potential discharge locations (Treatment Facility No. 1, Ponds 2 through 8, and Mud Water Canyon discharge) only five facilities have available water quality data. These include discharges from Ponds 4, 5, 6, and 8, and Mud Water Canyon discharge.

Summary of Water Quality Data

Mean Values	Total Dissolved Solids (mg/l)	Total Suspended Solids (mg/l)	Period
Pond No. 4	1531.7	38.5	10/83-9/85
Pond No. 5	791.1	33.0	4/83-10/85
Pond No. 6	1037.2	18.5	4/83-9/85
Pond No. 8	1846.3	25.0	7/85

All four of the facilities drain to an ephemeral drainage; Serviceberry Creek (1), and then to the Price River, tributary to the Colorado River. Background TDS values for the lower parts of this drainage have been measured at 7,300 mg/l. The discharges from the ponds listed above are less than background TDS measured at Surface Water Station 10-1 in Sage Brush Canyon (1) downstream of the ponds. The average value for TDS at this station in 1985 was 1,932 mg/l. The values ranged from 599 mg/l on 6/13/85 to 3,168 mg/l on 6/27/85. The lowest TDS value is reflective of runoff occurring during a snowmelt period. Figure 14 in the Plateau PAP shows examples of this snowmelt dilution effect. The TSS data given in the above table indicates that Pond #4, 5, 6, and 8 have operated in compliance with the 70 mg/l limit identified in their NPDES permit.

Plateau Mining Company has committed to providing an adequate surface water reclamation plan for the Star Point Mine by October 1, 1987. This plan will identify the necessary measures to provide for contemporaneous reclamation of the disturbed areas preventing impacts to the quality and quantity of surface water. In addition, the use of adequate sediment controls mitigates the overall effects of mining on the surface water system. The effects of discharging mine water into the Mud Water Canyon drainage will be determined by maintaining an effective monitoring system to determine if any adverse impacts to the environment would occur and could be prevented.

As mentioned in the previous section on subsidence, the Star Point Mines will mine a portion of the headwaters of the NFRF Miller Creek (16) and the risk for development of tension cracks within the stream channel is considered to be moderately high. Because of this potential impact, the Plateau Mining Company will be required to develop a sophisticated monitoring system to detect any changes in the hydrologic regime of this stream channel during and after mining. This monitoring system will include identification of gaining and losing reaches through stream surveys and the installation of a continuous monitoring system directly below the area of potential impact.

Plateau Mining Company will use one of the following engineering methods to mitigate any change to the hydrologic regime of the NFRF Miller Creek if an impact is detected through monitoring.

1. Seal the cracks in the stream channel with bentonite or other environmentally safe materials.
2. If cracks are too large, rags or some other material will be hand placed in them at a depth of approximately two feet to provide a stop point for bentonite pellets.
3. Concrete or epoxy mixtures.
4. Surface stabilization accomplished by hand tools.

Implementation of one of these engineering methods will occur following the diversion of surface flow around the impact area by culvert, flexible fabric tubing or plastic liners and an assessment and approval of the appropriate engineering method to mitigate impact to the stream channel.

Hiawatha Mines Complex. In the vicinity of the Hiawatha Mines Complex, the CIA is dissected by two drainage systems, Miller Creek (16) and Cedar Creek (15). The drainage area for Miller Creek, above the confluence with Serviceberry Creek (1), is about 29,700 acres. Streamflow in Miller Creek is perennial from the headwaters of the NFRF Miller Creek. Cedar Creek is also a perennial stream with a drainage area of approximately 5,300 acres. Cedar Creek receives approximately 800 gpm of discharge from the old Mohrland Mine portal located south of the Hiawatha Mines Complex.

Mine water is used by U.S. Fuels Company for fire prevention and dust suppression in King 4 Mine and by the town of Hiawatha for culinary purposes. These uses are covered by water rights claimed by U.S. Fuels Company for 4,758 gpm (3,746 gpm in surface water rights and 1,012 gpm in ground-water rights). Mine water discharge from the Mohrland Mine portal is regulated under the National Pollutant Discharge Elimination System (NPDES) permit UT-0023094.

Water is piped to the town of Hiawatha (20 gpm) and coal preparation facility (545 gpm) from the mines. The Left fork of the North Fork of Miller Creek is diverted into an underground water storage reservoir that provides water for the town of Hiawatha. This water, together with the water intercepted in the mine, is stored in the mined-out section of the abandoned Hiawatha No. 2 Mine. Maximum storage volume in this underground reservoir is about 120 million gallons (368 acre-feet). Approximately 60 million gallons (184 acre-feet) are normally stored in this reservoir.

Water in excess of that used in the mining operation is routed south by gravity to the Mohrland Mine Portal where it is collected and piped to the town of Hiawatha. Excess water is discharged into Cedar Creek (15). At the town of Hiawatha there are four water storage tanks with a combined capacity of 245,000 gallons (0.75 acre-feet). Water is treated and then stored in the 40,000 gallon (0.1 acre-feet) tank 5A near the preparation plant.

Coal processing waste piles (Figure 4) at Hiawatha Mines Complex are at 7,200 feet elevation and receive 12 inches of annual precipitation. The vegetation in the refuse area is a mixed salt desert shrub community. The waste piles have been in existence since the 1940's, encompass approximately 133 acres and include 4 slurry ponds. Table XIII-11 of the PAP indicates coal waste samples are above suspect levels for selenium with concentrations ranging from 1.93 to .91 mg/kg. However, the contribution of selenium to ground or surface waters by the coal waste should have minimal effects on water quality. Any seepage from the slurry ponds would flow to Miller Creek because of its proximity and the gradient to the creek. The amount of seepage compared to the flow of Miller Creek would dilute any deleterious concentration of selenium in seepage waters. The average flow of Miller Creek is 428 gpm.

Other parameters listed in Table VIII-11 of the PAP were within acceptable limits, except for boron and iron in one sample from slurry pond 3 and 4, respectively. Boron should not pose a problem since this element is of concern in irrigated areas where toxicities can occur in crops. The water quality of adjacent Miller Creek has a high inherent salinity hazard for irrigation waters and should not be used for irrigation without intensive management. Again, the flow of Miller Creek would dilute any boron concentration in seepage water.

Iron is a product of pyrite weathering, and may indicate acid mine drainage. The pH of the sample with the high value was 7.35. At this pH, the material is still buffered and does not indicate acid-forming material. Iron at this pH is also not readily soluble, and therefore, iron should not pose a problem to receiving waters.

The coal waste was not analyzed for acid-base potential, but pH values indicate that the refuse is basic, with only one sample being neutral (pH 6.8). Existing water quality data from Miller Creek, which is adjacent to the waste pile, indicate there are no degrading effects from seepage of the coal waste piles or slurry ponds. Considering the time involved in oxidation of the waste, the calcareous nature of the soils and the buffering capacity of the water in Miller Creek, along with the alkalinity of the slurry pond water (PAP, page 81A), these factors should be great enough to neutralize any acid produced in the coal processing waste piles.

A comparison (PAP, page 81A) of slurry pond water and Miller Creek water sampled adjacent to the slurry ponds shows that the pond water is slightly higher in sulfates, iron, and TDS. Although the slurry water may degrade further with increased contact time with slurry sediments, any seepage should have little consequence on the water quality of Miller Creek. The natural quality of Miller Creek water is poor since it traverses the Mancos Shale. The contribution of salts into the Price River basin by the Mancos Shale has been well documented (Mundorff, 1972; Ponce, 1975; Laronne and Schumm, 1977).

Surface water at a higher elevation in the CIA has a low TDS concentration, usually less than 400 mg/l, and a low TSS concentration, usually less than 30 mg/l. Concentrations of dissolved sodium and chloride are usually less than 15 mg/l. The predominant dissolved chemical constituents are calcium and bicarbonate. Water quality during snowmelt runoff tends to be higher in calcium carbonate and water quality from ground-water discharge tends to have higher concentrations of magnesium and sulphate. Values of pH were fairly constant, ranging from 7.6 to 8.1.

The Utah State Board of Health has established water quality standards to protect against controllable pollution to beneficial use of water. For the Miller Creek basin (16), the pertinent water quality standards are for nongame fish (Class 3c) and irrigation of crops and stockwatering (Class 4) (Utah State Board of Health, 1978).

TDS levels of surface waters immediately below some of the active mine areas exceed the water quality standard for irrigation use, but the effects are mitigated by dilution from undisturbed surface waters. TDS concentrations in Miller Creek are within the water quality standards at the point that it flows out of the Hiawatha Mines Complex permit area; however, TDS concentrations increase about two-fold when comparing above-mining stations and below-mining stations.

Dissolved constituents continue to increase in Miller Creek as water flows across the Mancos Shale. At the junction of Miller Creek and Utah Highway 10 (about 10 miles east of the permit area), TDS concentrations average more than 3,200 mg/l, and the dominant dissolved chemical constituent is sulfate (Mundorff, 1972). The only parameter to exceed pertinent water quality standards is TDS.

The sodium adsorption ratio (SAR) for the area is low. For the headwater areas of the Miller Creek and Cedar Creek drainages, the SAR is less than 0.5. At the base of the Wasatch Plateau, the SAR values are usually between 0.8 and 2.0. On the Mancos Shale, the SAR values range between 1.0 and 4.0. Surface water derived from snowmelt flow usually has a lower SAR value, however, both sodium and SAR increase during the low flow period as streams traverse the Mancos Shale.

Both SAR and TDS combine to degrade irrigation water. All of the water in the study area exhibits a low sodium hazard for snowmelt flows, but Miller Creek at Utah Highway 10 shows a medium sodium hazard during low flow periods. This increase in TDS and SAR as streams cross the Mancos Shales is a natural nonpoint source of pollution.

TDS concentrations in surface water below the elevation of coal mining activities are higher than in areas above coal mining activities. TDS increases are associated with increases in sulfate, chloride, magnesium and sodium concentrations. Current TDS levels do not exceed any existing recommended water quality criteria for current water uses. Future mining will cause an increase in TDS concentration, but this level will also be below state and federal water quality criteria. TDS loads (i.e., concentration multiplied by flow rate) are approximately 900 tons per year from nonpoint sources associated with existing mining operations on Miller Creek. Because no new surface disturbances are proposed, the TDS load should not increase in the future. There is no current active surface mining operation on Cedar Creek, but an increase of 180 tons per year from nonpoint sources is projected in relation to future mining operations on Cedar Creek.

Water chemistry of surface waters in the CIA naturally change from a calcium carbonate type to a magnesium type as streams traverse the Blackhawk Formation and the Mancos Shale. The Mancos Shale has a significant impact on surface water quality. TDS concentrations of streams that interact the Mancos Shale area are as much as 100 times higher than TDS levels of streams that interact overlying lithologies within the CIA. Most of these increases are natural and are probably caused by rain and leaching within stream channels or ground water flowing through the formation leaching available salts from the marine shales, and discharging into the

surface waters. Impacts resulting from the surface facilities associated with mining in the CIA are overshadowed by the degradation of water quality from streams traversing the Mancos Shales.

Sulfate levels are presently below established water quality standards, and if projected estimates by the mine of sulfate increases are accurate, surface disturbances associated with the King 7 and 8 Mines will cause about a two-fold increase in sulfate concentrations. Projected sulfate concentrations will remain below water quality standards.

TSS concentrations are also higher downstream from surface facilities associated with mining. Most of the increased suspended sediment naturally settles out before Miller Creek or Cedar Creek leaves the permit area because of relatively flat stream gradients. In the Office of Surface Mining Technical Analysis a model was used to route the known water quantity and quality of Miller Creek (16) (at the town of Hiawatha) and of Serviceberry Creek (1) (near the town of Wattis) to the confluence of the two streams. According to the results of the model, the TDS concentration below the confluence of Serviceberry Creek and Miller Creek will exceed the water quality standard for irrigation use during the middle and late summer months. Most of the TDS concentration is caused by the Serviceberry Creek traversing the Mancos Shale, however.

Both concentrations of TSS and TDS are higher downstream than upstream of the mine site and can be attributed to both natural and mine-related causes. The Division considers the Mancos Shale as the major source for surface water contamination.

Bear Canyon Mine and Trail Canyon Mine. The Trail Canyon and Bear Canyon mines' surface facilities are primarily found in the Bear Creek-Trail Creek Drainage Areas (9, 10, 12). Both Trail Canyon and Bear Canyon are perennial streams which flow in response to storm events and maintain a base flow associated with perennial springs. The main concern in terms of water quality deterioration downstream is T.S.S. The TSS concentrations in Bear Creek (10) in 1984 varied from a high of 28,092 (mg/l) in May of 1984 to a low of 122 (mg/l) in September of 1984 with five monthly readings within the 1,000-2,000 mg/l range. The suspended sediment concentrations in Trail Creek (9) in 1984 varied from 1,400 mg/l in May of 1984 to a low of 1.0 mg/l in February of 1984 with seven monthly readings below 100 mg/l. These high TSS values are associated primarily with natural climatic and erosional processes, although a proportion may be attributed to removal of vegetation from roads and mine pads and normal mine operations, e.g., loading coal. Sediment controls do exist for all surface disturbances in both canyons. Therefore, the impact associated with 20 acres of mining disturbance in Trail and Bear canyons is minimized by surface controls (i.e., sediment ponds, diversion ditches, filter fences, dugout ponds, etc.).

VI. Summary

Mine operations within the CIA currently intercept regional aquifer (450 gpm) and fault conduit flow (1,050 gpm) at an approximate rate of 1,500 gpm. Of this total, approximately 630 gpm are consumptively lost to mine ventilation (80 gpm) and evaporation at coal preparation facilities (545 gpm). The remaining 870 gpm are discharged, without interbasin transfer of water, to streams.

Mine water discharges, with the exception of Star Point Mines, meet required effluent limitation.

Future mining operations are designed to avoid interception of fault conduit flow and accordingly, inflow from the regional aquifer is estimated to increase from 450 gpm to 591 gpm. Approximately 80 percent of the inflow will be derived from storage and 20 percent from discharge. Consumptive use is not anticipated to increase. Mine water discharge (1,350 gpm) and ventilation losses (300 gpm) will be discontinued upon cessation of mining. Concomitantly, flooding of abandoned workings will initiate. An upper limit of 20 years has been estimated for complete flooding of workings and re-establishment of the premining ground-water system.

Division of spring flow is considered to be at overall low risk. However, reduction in flow along the upper reach of the NFRF Miller Creek is considered to be at moderately high risk. A generalized mitigation plan has been proposed for minimizing mining-induced impacts to NFRF Miller Creek. Division approval of the method implemented to restore the stream channel will be contingent upon an assessment of the mining induced impacts.

Sediment control measures have been and will be designed and implemented to reduce and stabilize contamination of surface waters.

Following cessation of mining and coal processing, waste piles will be adequately covered with topsoil and all disturbed areas will be stabilized and revegetated to prevent surface water contamination.

Future development in the Wild Horse Ridge and Mohrland areas and/or the recommencement of mining at the Trail Canyon Mine may result in further dewatering of the ground-water system. Permitting of new development will require implementation of sediment control measures that minimize impacts to surface water.

The designs proposed for all anticipated mining operations within the CIA are herein determined to be consistent with preventing damage to the hydrologic balance outside the proposed mine plan areas.

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