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# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

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801-538-5340

May 28, 1991

Mr. Rick Olsen, President  
Soldier Creek Coal Company  
P. O. Box 1  
Price, Utah 84501

Dear Mr. Olsen:

Re: Revised State Permit and Decision Package, Soldier Creek Coal Company, Soldier Canyon Mine, ACT/007/018, Folder #2, Carbon County, Utah

Enclosed is a revised permanent program mining permit for the Soldier Canyon Mine, which includes the new topsoil storage area. Also included is a copy of the State's Decision Document for the storage site.

Please note that for purposes of responding to the stipulations, the permit approval date is the date at the top of the first page of the revised permit, May 28, 1991. The permit will still expire on the renewed permit expiration date, February 3, 1992. Two copies of the permit are included. Please read the stipulations in Attachment A, then sign both copies and return one to the Division.

Your cooperation during the permitting process is appreciated.

Best Regards,

A handwritten signature in cursive script that reads "Dianne".

Dianne R. Nielson  
Director

DRH/mbm  
Enclosures

cc: P. Rutledge, OSM, Denver  
R. Hagen, OSM, Albuquerque  
S. Demczak, DOGM, PFO  
"B" Team

UTAH DIVISION OF OIL, GAS AND MINING  
STATE DECISION DOCUMENT AND  
TECHNICAL ANALYSIS

Soldier Creek Coal Company  
Soldier Canyon Mine  
Topsoil Storage Area Addition  
ACT/007/018  
Carbon County, Utah

May 28, 1991

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- \* Letters of Concurrence and Consultation
  - Division of State History, March 29, 1991
  - Bureau of Land Management, April 4, 1991
  - Division of Wildlife Resources, April 12, 1991
  - Memo from Joseph C. Helfrich, 1991
  - AVS Clearinghouse Recommendation, 1991
- \* Revised Permit

## ADMINISTRATIVE OVERVIEW

Soldier Creek Coal Company  
Soldier Canyon Mine  
Topsoil Storage Site Addition  
ACT/007/018  
Carbon County, Utah

May 28, 1991

### BACKGROUND

Soldier Creek Coal Company (SCCC) proposes to add a topsoil/substitute topsoil storage site to the currently approved permit area for the Soldier Canyon Mine. The site consists of 4.5 acres of BLM ground of which 2.3 acres are planned for disturbance. This proposal is being handled as a permit revision because the site is not contiguous to the rest of Soldier Creek's permit area and because of its proximity to a county road.

The Mining and Reclamation Plan (MRP) for the Soldier Canyon Mine was originally approved by the Division of Oil, Gas and Mining (DOGM) and the Office of Surface Mining Reclamation and Enforcement (OSMRE) on June 10, 1985. The approved permit area consisted of two federal coal leases, SL-051279-063188 and U-50722, encompassing 2,143.81 acres. The Bureau of Land Management (BLM) administers 590 of those acres and the remainder are privately owned.

In June of 1986 SCCC was sold to the Sun Company. A new MRP was submitted which incorporated two new state coal leases (ML-21994 and ML-22675) and portions of two other state leases (ML-42648 and ML-42649), held by affiliates of Sun Company, into the permit area. The new MRP was approved by DOGM on February 3, 1987, bringing the permitted area to a total of 4,347.99 acres. Due to the extensive additions to the permit area and submittal of a complete new MRP, a new five-year permanent program was issued with the approval.

SCCC acquired state lease ML-44365 on April 3, 1989 and requested that it be added to the permit area on April 17, 1989. The lease encompassed 557.20 acres. A revised mining permit incorporating lease ML-44365 was issued on August 9, 1991. This brought the total permit acreage to 4905.19 acres.

In order to accommodate an increase in production and additional expansion at the mine site SCCC requires more storage space. With the approval of the topsoil/substitute topsoil storage site, an additional 4.5 acres will be added to the permit area, bringing the total permit acreage to 4909.69 acres. No additional coal leases are involved.

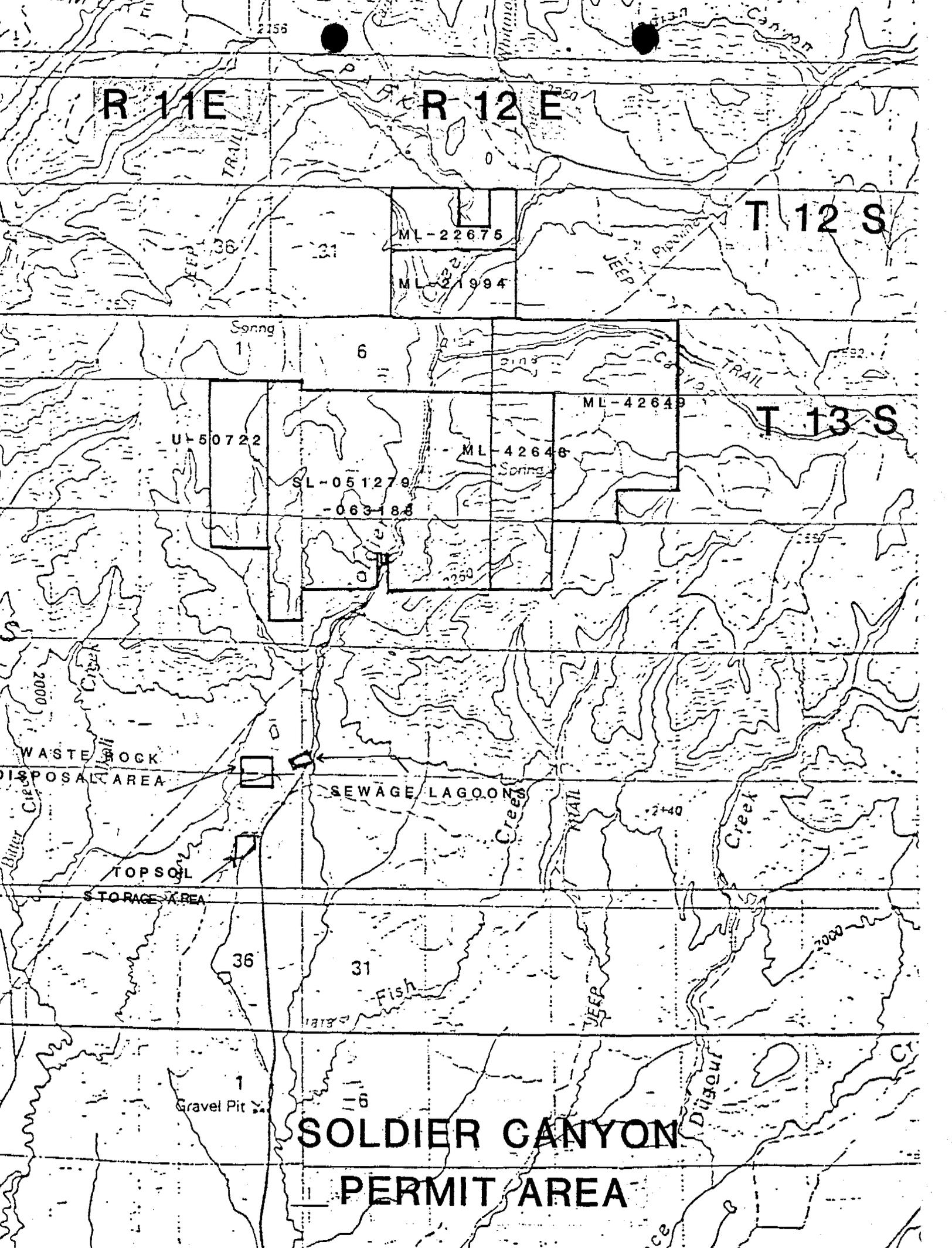
## ANALYSIS

The topsoil site is located in Section 25, Township 13 South, Range 11 East and was selected because of its location to the mine facilities and a future waste rock site. The site is located on public lands managed by the U.S. Department of the Interior, Bureau of Land Management and its principal use is wildlife habitat and livestock grazing. The 4.5 acre site will be fenced and access will be made by a 100 foot ancillary road. Of the 4.5 acres, only 2.3 acres are planned for disturbance. Use of the site will consist of storage of topsoil/substitute topsoil and landscape boulders/riprap materials. Soldier Creek Coal Company has revised the reclamation bond amount from \$577,000 to \$1,940,000 which includes the topsoil storage site.

A Cumulative Hydrologic Impact Assessment (CHIA), which included the area of the topsoil storage site, was done in February 1987. Effects to the hydrologic balance resulting from the storage of topsoil are expected to be minimal and most likely would only affect surface waters. The initial review of SCCC's plan uncovered various deficiencies. SCCC subsequently submitted more specific and detailed plans regarding the use of the topsoil site. At this time the only outstanding issue is the Division of Wildlife Resources requirement to add four (4) shrub species to the seed mix. This requirement will be a condition to permit approval.

## RECOMMENDATION

SCCC has demonstrated that use of the Topsoil/Substitute topsoil storage site can be done in conformance with the Surface Mining Control and Reclamation Act, and the corresponding Utah Act and performance standards. No issues were raised during the review process or public comment period which have not been resolved. A 510(c) report was run on the Applicant Violator System and no problems were encountered (see attached Memos). It is therefore recommended that approval be given for the addition of this 4.5 acre site to the permit area.



R 11 E

R 12 E

T 12 S

T 13 S

**SOLDIER CANYON  
PERMIT AREA**

ML-22675

ML-1994

U-50722

ML-42648

SL-051279

-063-188

ML-42649

WASTE ROCK  
DISPOSAL AREA

SEWAGE LAGOON

TOPSOIL

STORAGE AREA

Gravel Pit

36

31

Fish

2+40

2000

Indian

## PERMITTING CHRONOLOGY

Soldier Creek Coal Company  
Soldier Canyon Mine  
Topsoil Storage Site Addition  
ACT/007/018  
Carbon County, Utah

May 28, 1991

- |                         |   |
|-------------------------|---|
| 12/10/90                | Soldier Creek Coal Company (SCCC) requests addition of Topsoil Storage Site to the Soldier Canyon Mine permit area. |
| 2/12/91 thru<br>3/05/91 | SCCC publishes notice of a complete application for the topsoil storage area.                                       |
| 3/08/91                 | SCCC submits copies of the topsoil revision for other agency review.  |
| 3/29/91 and<br>4/02/91  | DOGM notifies SCCC of deficiencies in the plan which must be addressed prior to final permit approval.              |
| 4/05/91                 | Public comment period ends with no comments received.   |
| 4/15/91                 | SCCC responds to deficiencies.  |
| 5/28/91                 | DOGM issues Decision Document and revised state permit.   |

MINE PLAN INFORMATION

Mine Name: Soldier Canyon Mine State ID: ACT/007/018

Operator: Soldier Creek Coal Company County: Carbon

Controlled By: The Sun Company Contact Person(s): J. Thomas Paluso  
 Telephone: (801) 637-6360 Position: Chief Engineer

New/Existing: Both Mining Method: Room and Pillar

Federal Lease No(s): SL-051279-063188; U-50722  
 Legal Description(s): SL-051279-063188: T.13S., R.11E., Sec. 12: E1/2 E1/2, Sec. 13: NE1/4NE1/4, SE1/4NE1/4, NE1/4SE1/4, Sec. 18: Lot 2 (SW1/4NW1/4), SE1/4NW1/4T.13S., R.12E., Sec. 7: All, Sec.8: W1/2, Sec.17: NW1/4, Sec. 18: N1/2NE1/4, SE1/4NE1/4, NE1/4NW1/4, Lot 1 (NW1/4NW1/4); U-50722: T.13S., R.11E., Sec.12: E1/2W1/2, W1/2E1/2, Sec. 13: NW1/4NE1/4, NE1/4NW1/4

State Lease No(s): ML-21994; ML-22675; ML-42648(part); ML-42649(part); ML-44365  
 Legal Description(s): ML-21994: T.12S., R.12E., Sec.32: S1/2; ML-22675: T.12S., R.12E., Sec.32: NE1/4NE1/4, S1/2NE1/4, NW1/4; ML-42648: T.13S., R.12E., Sec.8:E1/2, Sec.17: NE1/4; ML-42649: T.13S., R.12E., Sec.4: S1/2, Lots 1,2,3,4, Sec.5: SE1/4, Lots 1,2, Sec.9: W1/2, NE1/4, N1/2SE1/4; ML-44635: T.13S., R.12E., Sec.5: SW1/4, Lots 3,4, Sec.6: All

Other Leases (identify): None  
 Description(s): \_\_\_\_\_

Ownership Data:

<u>Surface Resources (acres):</u>	<u>Existing Permit Area</u>	<u>Proposed Permit Area</u>	<u>Total Life Of Mine Area</u>
Federal	<u>590.19</u>	<u>4.5</u>	<u>594.69</u>
State	<u>2755.80</u>	<u>          </u>	<u>2755.00</u>
Private	<u>1560</u>	<u>          </u>	<u>1560</u>
Other	<u>          </u>	<u>          </u>	<u>          </u>
<b>TOTAL</b>	<b><u>4905.19</u></b>	<b><u>4.5</u></b>	<b><u>4909.69</u></b>

Coal Ownership (acres):

Federal	<u>2111.63</u>	<u>          </u>	<u>2111.63</u>
State	<u>2755.00</u>	<u>          </u>	<u>2755.00</u>
Private	<u>          </u>	<u>          </u>	<u>          </u>
Other	<u>          </u>	<u>          </u>	<u>          </u>
<b>TOTAL</b>	<b><u>4866.63</u></b>	<b><u>          </u></b>	<b><u>4866.63</u></b>



## FINDINGS

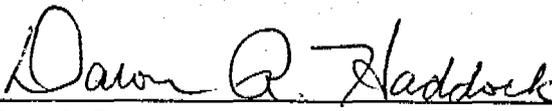
Soldier Creek Coal Company  
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Topsoil Storage Site Addition  
ACT/007/018  
Carbon County, Utah

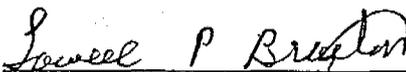
May 28, 1991

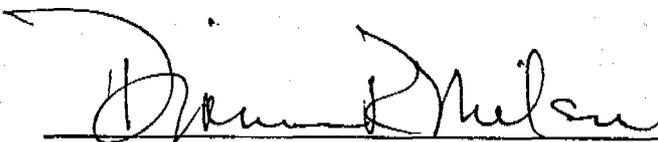
1. The revised plan and the permit application are accurate and complete and all requirements of the Surface Mining Control and Reclamation Act (the "Act"), and the approved Utah State Program have been complied with (R614-300-133.100).
2. The applicant proposes acceptable practices for the reclamation of disturbed lands (Mining and Reclamation Plan (MRP) Vol. 9, Chapter 3.0). 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 MRP.
3. The assessment of the probable cumulative impacts of all anticipated coal mining and reclamation activities in the general area on the hydrologic balance has been made by the regulatory authority. The Mining and Reclamation Plan (MRP) proposed under the application has been designed to prevent damage to the hydrologic balance in the permit area and in associated off-site areas (R614-300-133.400 and UCA 40-10-11 {2}{c}) (See Cumulative Hydrologic Impact Analysis (CHIA) following this Findings Document).
4. The proposed lands to be included within the permit area are:
  - A. not included within an area designated unsuitable for underground coal mining operations (MRP, p. 2-7);
  - B. not within an area under study for designated lands unsuitable for underground coal mining operations (MRP, p. 2-7);
  - 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) (MRP, p. 2-6);

- D. Within 100 feet of the outside right-of-way of Utah Highway 53, a public road. The applicant has received formal permission from the Carbon County Commissioners to mine within 100 feet of the right-of-way of a public road;
  - E. not within 300 feet of any occupied dwelling (MRP, p. 2-6) (R614-300-133-220).
5. The regulatory authority's issuance of a permit is in compliance with the National Historic Preservation Act and implementing regulations (36 CFR 800) (R614-300-133.600). See attached letter from State Historic Preservation Officer (SHPO) dated March 29, 1991.
  6. The applicant has the legal right to enter and complete mining activities in the Topsoil Storage site through a federal land use Permit issued by the Bureau of Land Management (R614-300-133.300).
  7. A 510(c) report has been run on the Applicant Violator System (AVS), which shows that: prior violations of applicable laws and regulations have been corrected; neither Soldier Creek Coal Company, Inc. or its parent company are delinquent in payment of fees for the Abandoned Mine Reclamation Fund; and the applicant does not control and has not controlled mining operations with demonstrated pattern of willful violations of the Act of such nature, duration, and with such resulting irreparable damage to the environment as to indicate an intent not to comply with the provisions of the Act (R614-300-133.730).
  8. Underground coal mining and reclamation operations to be performed under the permit will not be inconsistent with other such operations anticipated to be performed in areas adjacent to the proposed permit area. No other mines are operational in the immediate vicinity.
  9. The applicant has posted a surety bond for the Soldier Canyon in the amount of \$1,940,000.00. This bond is adequate to reflect costs which would be incurred by the state to reclaim areas currently disturbed.
  10. No lands designated as prime farmlands or alluvial valley floors occur on the permit area (R614-300-133.200).

11. The proposed postmining land-use of the permit area is the same as the pre-mining land use and has been approved by the regulatory authority and the surface land management agency.
12. The regulatory authority has made all specific approvals required by the Act, the Cooperative Agreement and the Federal Lands Program.
13. 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 habits (R614-300-133.500).
14. All procedures for public participation required by the Act, and the approved Utah State Program have been complied with (R614-300-120).
15. No existing structures will be used in conjunction with the Topsoil Storage area, other than those constructed in compliance with the performance standards of R614-301 and R614-302 (R614-300-133.720).

  
\_\_\_\_\_  
Permit Supervisor

  
\_\_\_\_\_  
Associate Director, Mining

  
\_\_\_\_\_  
Director

# Cumulative Hydrologic Impact Assessment

Soldier Creek Coal Company  
Soldier Canyon Mine  
ACT/007/018  
Carbon County, Utah

February 4, 1987

## I. Introduction

This report is a Cumulative Hydrologic Impact Assessment (CHIA) of Soldier Creek Coal Company's Soldier Canyon Mine operating in Carbon County, 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 federal legislation passed under the Surface Mining Control and Reclamation Act (SMCRA) and subsequent Utah and federal regulatory programs under UMC 786.19(c) and 30 CFR 784.14(f), respectively.

The Soldier Canyon Mine is located in the Book Cliffs Coal Field approximately 12 miles northeast of Price, Utah (Figure 1). The Book Cliffs form a rugged, southerly facing escarpment that delineates the Uintah Basin to the north from the San Rafael Swell to the south. Elevations along the Book Cliffs range from approximately 5,000 to 9,000 feet.

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

Precipitation varies from 20 inches at higher elevations to 5 inches at lower elevations. The Book Cliffs area may be classified as mid-latitude steppe to semi arid desert.

Vegetation varies from the sagebrush/grass community type at lower elevations to the Douglas fir/aspen community at higher elevations. Other vegetative communities include mountain brush, pinyon-juniper, pinyon-juniper/sagebrush and riparian. These communities are primarily used for wildlife habitat and livestock grazing.

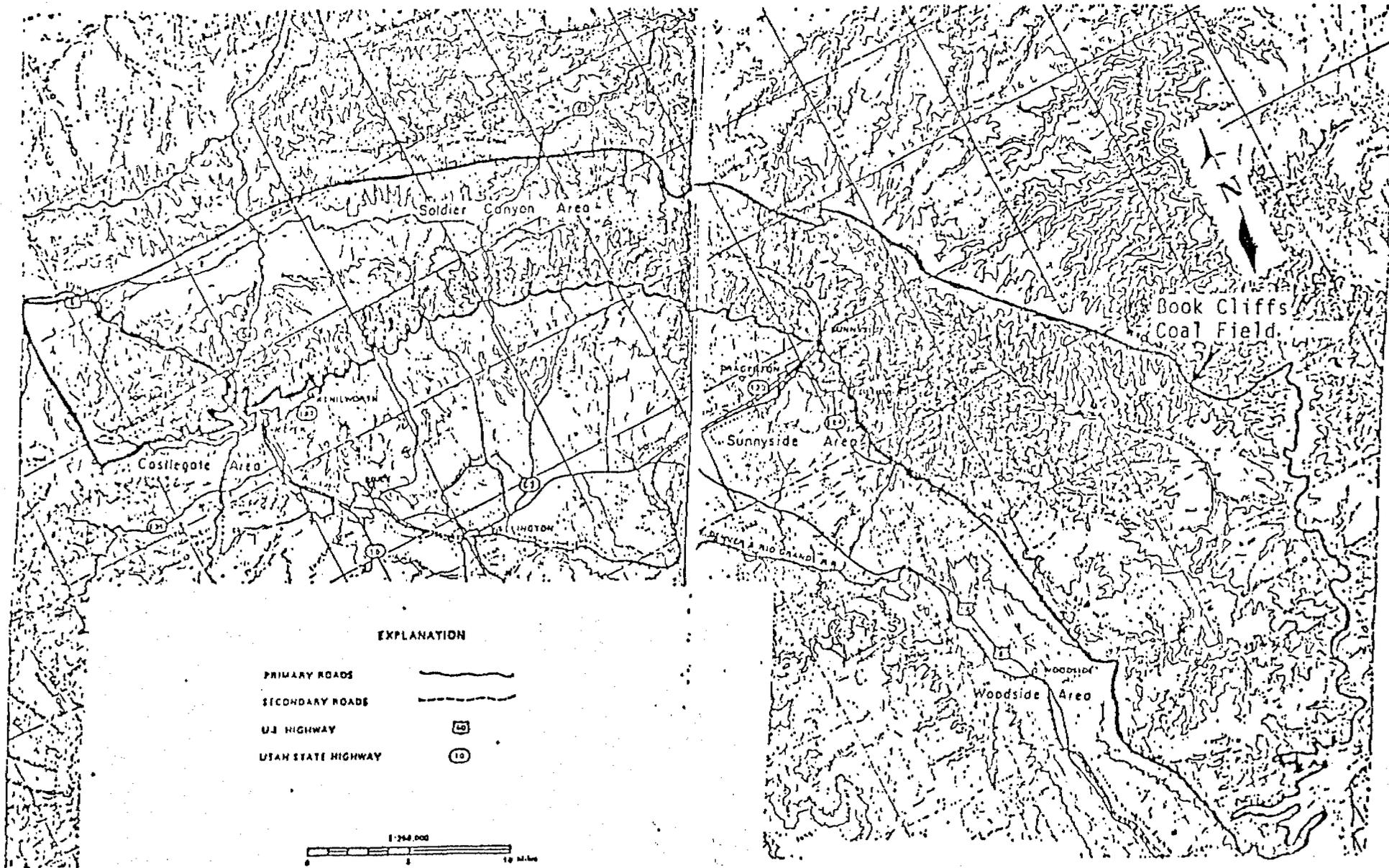


Figure 1. Book Cliffs Coal Field.

From: Doelling 1972.

Surface runoff from the Book Cliffs area flows into the Price River drainage basin of east-central Utah. The Price River originates near Scofield Reservoir and flows southeasterly into the Green River, north of the town of Green River, Utah. Water quality 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 a major contributor to poor water quality. Depending upon the duration of contact, water quality degrades downstream to where total dissolved solids (TDS) levels of 3,000 milligrams per liter (mg/l) are not uncommon. The predominant ion leached from the Mancos Shale is sulfate ( $SO_4$ ) with values over 1,000 mg/l common in the lower reaches of the Price River.

## II. Cumulative Impact Area (CIA)

The Cumulative Impact Area is shown in Plate 1, Figure 2. It encompasses approximately 21,700 acres and surrounds the Soldier Creek Mine complex. The permit area consists of 4,348 acres and includes the mine, a waste rock disposal area and a sewage lagoon site. Soldier Creek, Pine Creek and Fish Creek represent the drainages of the CIA.

The closest minesite to the CIA is Andalex's Centennial Project, Figure 2, approximately 2 miles west of the Soldier Creek Mine Plan Area. Presently the mining effects from these two mines do not overlap and are therefore considered separate hydrologic impact areas. Future mining may occur in the area between these mine permit areas depending on the results of an environmental assessment presently being conducted by the Bureau of Land Management (BLM).

On the southeast corner of the Soldier Creek mine plan area (Plate 1, Figure 2) is Sunedco's approved mine permit area. Mining plans for this area have been terminated by the company, and all federal leases within the approved permit area will be relinquished to the BLM.

## III. Scope of Mining

Soldier Canyon Mine is owned and operated by Soldier Creek Coal Company, a third tier subsidiary of Sun Company, Inc. The mine was first opened in 1906, but little coal was produced until 1935 when Premium Coal operated the mine continuously until 1972. During those years approximately 1.2 million tons of coal were produced.

In September of 1974 California Portland Cement Company purchased the property and after making certain improvements resumed production on June 15, 1976.

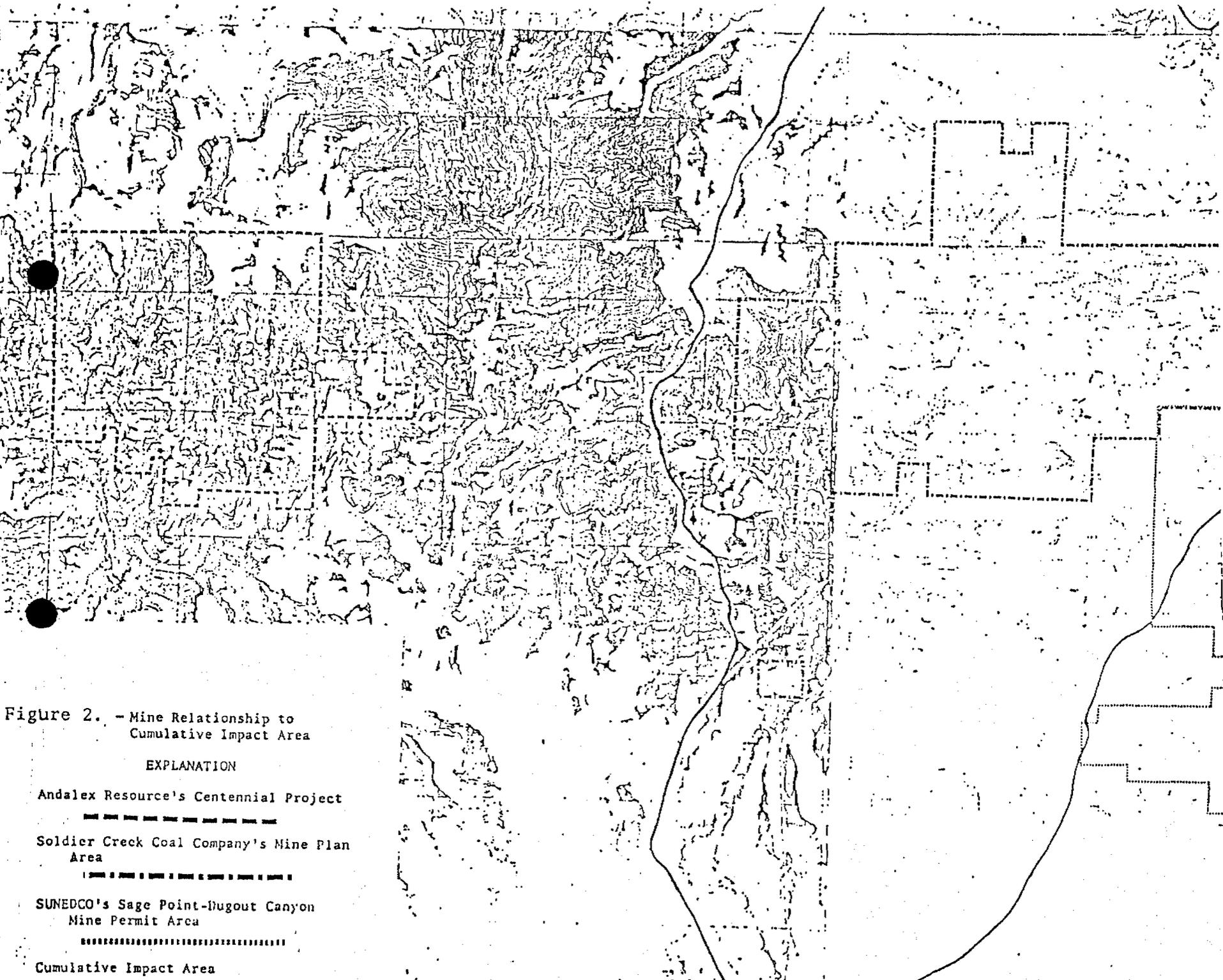


Figure 2. - Mine Relationship to  
Cumulative Impact Area

EXPLANATION

Andalex Resource's Centennial Project



Soldier Creek Coal Company's Mine Plan  
Area



SUNEDCO's Sage Point-Dugout Canyon  
Mine Permit Area



Cumulative Impact Area

On September 5, 1985 assets were transferred to Sunedco Coal Co., a subsidiary of Sun Company, Inc. Ownership of the federal and state coal leases are held by two affiliate companies, Sunedco Coal Company and Sunoco Energy Development Co. With the acquisition of the Soldier Canyon property, Sunedco Coal Company, chose to combine that acreage with certain adjacent acreage which had previously been included in a proposed project: Sage Point-Dugout Canyon.

Current mine production is estimated to be 800,000 tons for 1986. Future maximum annual production is expected to be approximately 1.75 million tons per year. Coal is being mined from the Rock Canyon seam by the room and pillar method. Future mining will include longwall mining methods and coal will be extracted from the Rock Canyon, Gilson and Sunnyside seams.

Mine workings are approximately 2 miles in width and extend 1.5 miles down dip. Mining, during the first five year permit term, will occur in the Rock Canyon and amd Sunnyside coal seams. Coal will be produced by longwall and room and pillar mining methods.

Overburden thickness ranges from approximately 100 feet under Soldier Creek Canyon to over 2,000 feet above the panels to be mined.

#### IV. Study Area

##### A. GEOLOGY

The geology of the CIA consists of stratigraphic units of consolidated rock ranging in age from Late Cretaceous to Tertiary (Eocene) as seen in Figure 3. The oldest rocks include members of the Mancos Shale. The Mesaverde Group overlies the Mancos Shale and consists of the Starpoint Sandstone, Blackhawk Formation, Castlegate Sandstone and Price River Formation. Overlying the Mesaverde Group are the North Horn Formation, Flagstaff Limestone and Colton Formation which form the Wasatch Group of Paleocene to Eocene age. The Green River Formation is Eocene in age and forms the uppermost consolidated formation in the CIA. Unconsolidated deposits formed from weathering and erosion exist as soils in Whitmore Park, terrace deposits and gravels along canyon streams and pediments at the base of escarpments.

There are no major disconformities in the area. The formations were tilted north-eastward in response to the rise of the San Rafael Swell, and Socally, Farnam Anticlines. The strike of the area changes from N 84°W on the west to N 65°W on the east. The dip ranges from 6° to 12° and averages 8° northeast.

Faulting within the CIA is minor. Only one fault with a two foot displacement was found between the right and left forks of Fish Creek. Fracturing appears to parallel the strike of the Book Cliffs

System	Series	Stratigraphic unit	Thickness (feet)	Description
TERTIARY	Eocene	Green River Formation	-	Greenish gray and white claystone and shale, also contains fine-grained and thin-bedded sandstone. Shales often dark brown containing carbonaceous matter. Full thickness not exposed.
		Colton Formation	300-2,000	Colton consists of brown to dark red lenticular sandstone, shale and siltstone, thins westwardly and considered a tongue of the Wasatch.
	Paleocene	Wasatch Formation	3,000	Wasatch predominantly sandstone with interbedded red and green shales with basal conglomerate. Found in east part of field and equivalent to Colton and Flagstaff in west.
		Flagstaff Limestone	0- 500	Flagstaff mainly light gray and cream colored limestones, variegated shale, and fine-grained, reddish brown, calcareous sandstone.
CRETACEOUS	Danian	North Horn Formation	350-2,500	Gray to gray green calcareous and silty shale, tan to yellow-gray fine-grained sandstone and minor conglomerate. Unit thickens to west.
		MINOR COAL		
	Maestrichtian	Tuscher Formation	0- 200	Light gray to cream-white friable massive sandstone and subordinate buff to gray shale that exhibits light greenish cast. Contains minor conglomerate and probably represents lower part of North Horn, only present in east part of field.
		Companian	Price River Formation	500-1,500
	MINOR COAL			
	Castlegate Sandstone		100- 500	White to gray, fine- to medium-grained, argillaceous massive resistant sandstone thinning eastwardly with subordinate shale. Carbonaceous east of Horse Canyon but coal is thin and lignitic.
	MINOR COAL			
	Mesa Verde Group	Blackhawk Formation	600-1,100	Cyclical littoral and lagoonal deposits with six major cycles. Littoral deposits mainly thick-bedded to massive cliff-forming yellow-gray fine- to medium-grained sandstone, individual beds separated by gray shale. Lagoonal facies consist of thin- to thick-bedded yellow-gray sandstones, shaly sandstones, shale and coal. Coal beds form basis of Book Cliffs coal field. Unit thins eastward grading into the Mancos Shale.
		MAJOR COAL SEAMS		
		Star Point Sandstone	0- 580	Yellow-gray massive medium- to fine-grained littoral sandstone tongues projecting easterly separated by gray marine shale tongues projecting westerly.
		Masak Tongue	4,300-5,050	Gray marine shale, locally heavily charged with carbonaceous material, slightly calcareous and spargiferous, non-resistant forming flat desert surfaces and rounded hills and badlands. Separated mainly to the west into tongues by westward projecting littoral sandstone which eventually grade into shale. Sandstones are fine- to medium-grained, yellow-gray to tan and medium-bedded to massive and cliff forming.
		Mancos Shale		
Santonian	Emery Sandstone			
Coniacian	Garley Canyon Sandstone			
	Blue Gate Shale			
Turonian	Ferron Sandstone			
	MINOR COAL			
Cenomanian	Tununk Shale			
	Dakota Sandstone	2- 126	Heterogeneous sandstone, conglomerate and shale, thin resistant cuesta former.	

Figure 3. Generalized Stratigraphy of the Soldier Canyon Mine Area (After Doelling, 1972).

escarpment, and hence the strike of the strata itself. It appears to be the result of isostatic adjustment and general upwarping associated with the San Rafael Swell and subsequent erosional, tectonic and orogenic events. Clear measurements taken in the currently operating mine show face cleat direction is within a few degrees of the strike of the coal bed.

Mining operations are restricted to the Blackhawk Formation. Data indicates five coal zones that show lateral consistency: from top to bottom they are the Sunnyside, Rock Canyon, Fish Creek, Gilson, and Kenilworth. The Sunnyside, Rock Canyon and Gilson Seams contain minable reserves and will be mined by Soldier Creek Coal Company.

#### B. TOPOGRAPHY AND PRECIPITATION

Topography ranges from less than 6,000 feet to approximately 8,500 feet in the CIA. Predominant features that exist in the CIA are cliffs, narrow canyons, valleys and pediments. Drainage in the CIA is characterized by a southerly draining system of perennial and ephemeral streams. Both Pine Creek and Soldier Creek are perennial streams and have headwaters that originate between 7500 and 8000 feet. Fish Creek, located near the eastern boundary of the CIA is ephemeral and flows only in response to rainfall and snowmelt. Additionally, a small unnamed ephemeral drainage exists near the western boundary of the CIA, south of the proposed waste rock disposal area.

Average annual precipitation ranges from approximately 10 inches in the vicinity of the waste rock disposal area to 16 inches in the headwater regions of Soldier Creek.

#### V. Hydrologic Resources

##### A. Groundwater

Groundwater in the CIA like groundwater in other parts of the Price River basin, occurs under both confined and unconfined conditions.

Snowmelt at higher elevations provides most of the groundwater recharge, particularly where permeable lithologies such as fractured or solution limestone are exposed at the surface. Vertical migration of groundwater occurs through permeable rock units and/or along zones of faulting and fracturing. Lateral migration initiates when groundwater encounters impermeable rock and flows laterally until either the land surface is intersected creating a perched spring or until vertical movement can continue.

Recharge has been estimated to be 3 to 8 percent (Danielson and Sylla 1983), 9 percent (Waddell et al 1983) and 12 percent (Simons, Li & Associates 1984) of the average annual precipitation for areas in the Wasatch Plateau and Book Cliffs coal fields.

The Blackhawk Formation, Castlegate Sandstone, Price River Formation, North Horn Formation, Flagstaff Limestone and Quaternary deposits all contain potential reservoirs or conduits for groundwater in the CIA. Reservoir lithologies are predominately sandstone and limestone. Sandstone reservoirs occur as channel and overbank, lenticular and tabular deposits, whereas limestone reservoirs have developed through dissolution and fracturing. Shale, siltstone and cemented sandstone beds act as aquatards or aquacludes to impede groundwater movement. The Mancos Shale is a regional aquaclude that limits downward flow within the CIA. Localized aquatards include the North Horn Formation and thin lithologies occurring within overlying units of the Price River, Castlegate and Blackhawk Formations.

Twenty-two springs (Table 1) or areas of multiple springs occur within the CIA (Plate 1). Twelve springs are located within the five-year permit area. The majority of springs flow from the contact zone between the Flagstaff Limestone and the North Horn Formation. No springs flow from the Blackhawk Formation within the CIA. All the springs on the escarpment are perched whereas those on the dip slope come from a ground water that has reached the surface through solution fractures or gradient levels.

Five wells are shown on Plate 1. Two wells were drilled within the mine to rock units above and below the Rock Canyon coal seam to help in defining the regional water table. Two wells were drilled by Eureka Energy in the early stages of exploration. The other well, as marked, is the shaft for the exhaust fan along Soldier Creek drilled to a depth of 80 feet. Other exploration wells drilled by Eureka Energy lie outside the CIA. A comprehensive study has been made of the water depths, quality, transmissivities of strata and flow directions adjacent to the Soldier Mine properties (Sage Point-Dugout Canyon Mine Permit).

Total mine discharge is approximately 130 gpm. The majority of inflow occurs from a fire area that has been sealed for over a year. SCCC is currently dewatering that area to continue mining operations. Mine discharge should be reduced when pumping is complete.

Groundwater quality varies greatly, depending on geology, physiography, and elevation. The best quality occurs in or near mountain recharge areas and the poorest quality in lowland areas. Waddell et al (1983) indicate that the concentrations of dissolved solids range from 250 to 2,000 mg/l in the Book Cliffs area. The

HYDROLOGIC DATA COLLECTION SITES  
SPRINGS

<u>MAP NUMBER</u>	<u>LOCATION</u>	<u>GEOLOGIC UNIT</u>	<u>LAND SURFACE ELEVATION</u>	<u>SPRING NAME</u>	<u>OTHER DESIGNATIONS*</u>
1	(D-12-11) 36nad	Flagstaff	7890		52 <sup>1</sup>
2	(D-12-12) 30dcc	Flagstaff	7560		53 <sup>1</sup>
3	" 33bcc	Flagstaff	7400		54 <sup>1</sup>
4	" 34ccd	Flagstaff	7605		3 <sup>1</sup>
5	(D-13-11) 1dab	Flagstaff	7930		55 <sup>1</sup> , S31-12
6	" 13acc	Aberdeen Tongue	6720	Drink	56 <sup>1</sup>
7	(D-13-12) 4acd	Flagstaff	7480		57 <sup>1</sup> , G-87 <sup>2</sup>
8	" 4bdc	North Horn	7410		2 <sup>1</sup> , G-88 <sup>2</sup>
9	" 4cdd	Flagstaff	7910		33 <sup>1</sup>
10	" 5cbc	North Horn	6980	Sulfur	8 <sup>1</sup> , G-89 <sup>2</sup>
11	" 5cbc	North Horn	6980		24 <sup>1</sup>
12	" 5ccb	North Horn	6970		9 <sup>1</sup>
13	" 7aad	Price River	6880		10 <sup>1</sup>
14	" 7cbb	North Horn	7600		
15	" 8daa	Flagstaff	7900	Lower Little Pine	39 <sup>1</sup> , S7-1 <sup>2</sup>
16	" 8dad	North Horn	7840	Timber Road	38 <sup>1</sup>
17	" 9cbb	Flagstaff	7940	Upper Little Pine	40 <sup>1</sup> , G-90/S8-1 <sup>2</sup>
18	" 9dcc	Flagstaff	8120		31 <sup>1</sup> , G-91 <sup>2</sup>
19	" 9dcc	North Horn	8090		32 <sup>1</sup>
20	" 9ddc	Flagstaff	8090		30 <sup>1</sup> , G-92 <sup>2</sup>
21	" 10abb	Flagstaff	7740	Water Hole	4 <sup>1</sup>
22	" 10adb	Flagstaff	7870	Pine Canyon	42 <sup>1</sup>

\*1. Sage Point/Dugout Canyon Permit Application; 2. Soldier Canyon Permit Application; 3. U.S. Geological Survey.

Table 1.

chemical characteristics of the groundwater vary with the formation and areally within formations. The concentration of dissolved solids in water from the Flagstaff Limestone ranges from 250 to 500 mg/l, whereas the concentrations of dissolved solids in the Blackhawk and North Horn Formations range from 500 to 2,000 mg/l. The principal chemical constituents in Flagstaff water are calcium and bicarbonate. Water from the Blackhawk is of variable chemical composition with no single dominant cation or anion. Where dissolved solids concentrations from water in the Blackhawk are affected by the Mancos Shale, sulfates of sodium and magnesium increase significantly. Waters from springs which issue near the Blackhawk/Mancos Shale contact have dissolved solids concentrations of 1,600 and 2,000 mg/l, respectively (Mundorff, 1972; Waddell et al, 1981).

#### B. Surface Water

The CIA is situated in the Book Cliffs near the headwaters of the Price River Basin. The entire lease area drains toward Soldier Creek, a perennial tributary of the Price River. The Price River meets the Green River about 40 miles east of the mine. The Green River flows southward from its confluence with the Price River approximately 75 miles until it discharges into the Colorado River.

The Price River drainage area contains 1,540 mile<sup>2</sup> above a USGS streamflow gauging station at Woodside, Utah, which is about 24 miles below the inflow from Soldier Creek. The period of record for this station is 1909-1911 and 1945 to present. The extreme flows recorded include a maximum of 9,720 cfs on September 11, 1980 and a minimum of zero which has occurred at various times. The average annual flow volume is given as 83,320 ac-ft, or 155 cfs.

The flow of the Green River has been measured at Green River, Utah, about 12 miles below the confluence of the Price and Green Rivers. Between October, 1894 to October, 1899 and October, 1904 to the present, the flow ranged from a minimum of 255 cfs on November 26, 1931 to a maximum of 68,100 cfs on June 27, 1917. The average discharge over the 83 years is 6,305 cfs.

Snowmelt is the major source of water for the perennial streams of the Price River Basin. Ephemeral streams are abundant in the basins, existing primarily at lower elevations where potential evapotranspiration exceeds precipitation. Summer precipitation in the form of intense thunderstorms may cause short-term flooding but not large volumes of runoff.

Water use in the higher elevations of the Price River Basin is primarily for wildlife and stockwatering purposes. Within the lower valley area, agricultural activities utilize some of the water (Mundorff, 1972). Minimum flows in the gauged streams and rivers in the basin occasionally reach zero. Storage reservoirs are common at higher elevations.

In general, the quality of water in the headwaters of the Price River Basin is excellent, with the upper watershed providing most of the domestic water needs of the people in the lower valley. However, the quality rapidly deteriorates down gradient as the streams cross the Mancos Shale Formation and receive irrigation return flows from lands situated on Mancos-derived soils (Price and Waddell, 1973). Waddell et al (1981) report that Price River and its tributaries generally have a dissolved solids concentration of between 250 to 500 mg/l upstream from Helper. The water in this area is of calcium bicarbonate type. Between Helper and the confluence with Soldier Creek, most of the flows originate on Mancos Shale or are irrigation return flows which pass through Mancos Shale derived soils. The Price River near the confluence with Soldier Creek has an average dissolved solids content of about 1,700 mg/l, including sulfates of calcium, magnesium and sodium. At Woodside, the weighted average dissolved solids content is between 2,000 and 4,000 mg/l, with the water type being strongly sodium sulfate (Mundroff, 1972).

Sediment yields from the upper portion of the Price River Basin are small, with erosion rates varying from 0.1 to 0.5 ac-ft/miles<sup>2</sup>/yr. The bulk of the sediment yield at the mouth of the Price River comes from limited areas covered by highly erodible shales. Annual sediment yields of 0.5 to 3.0 ac-ft/miles<sup>2</sup> are reported by Waddell et al (1981).

#### Surface Water Hydrology of the CIA

The CIA shown in Plate 1 is 21,700 ac of the Soldier Creek watershed. Topography in the area is rugged, with elevations varying from 6,600 ft to approximately 8,300 feet above sea level. Slopes vary from vertical cliffs to less than 2% along the ridges.

Water resources within or adjacent to the CIA include a few low yielding springs and streams. There are no major water bodies located within or adjacent to the CIA.

Soil cover varies with slope, with bare sandstone cliffs along the upper portions of the canyons, shallow silty soils on the milder slopes, and shallow sand-gravel alluvium in the channel bottoms. The soils classify as hydrologic soils group C and D. The infiltration rates of the soil results in moderately low infiltration capacity. Similar sub-basins within the Price River system indicate that runoff is approximately 16% of precipitation (UDWR, 1975).

The average annual sediment yield is approximately 0.2 to 1.0 ac-ft/miles<sup>2</sup> at the site (Waddell et al, 1981). Thus, the average annual sediment yield of the CIA is estimated to be 6.7 to 33.9 ac-ft for undisturbed conditions.

## Soldier Creek

The headwaters of Soldier Creek are located in the Roan Cliffs and Whitmore Park as shown on Plate 1. The creek flows for 13.5 miles generally southward to the Anderson Reservoir diversion. The Anderson Reservoir stores water for irrigated fields. Soldier Creek discharges into the Price River about 10 miles south of the reservoir diversion. The lower 19 miles of Soldier Creek flows over Mancos Shale.

A USGS stream gauging station is located on Soldier Creek just downstream from the mine. The station is identified as "Soldier Creek Below Mine, Near Wellington, Utah, No 09313975," and is identified on Figure 4 as Surface Water Sampling Location G-5. The altitude of the gauge is 6,650 ft. The drainage area above the gauge includes sub-basins I through V and is 17.5 miles<sup>2</sup> (Plate 1 and Table 2). The period of record is from September of 1978 to September, 1984, and measurements are seasonal with no records kept during the winter months from December to February.

The maximum and minimum discharges are 472 and 0.08 cfs, respectively. The average elevation of the basin is 7,599 ft. The stream channel is 5.9 miles long and 10 to 20 ft wide near the gauge station. The creek bottom is on rocky alluvium and occasional outcrops of bedrock. The average stream channel gradient is 6%, and the average gradient of the land surface is 30%. For the entire basin, the average stream and land gradients are 4 and 23%, respectively.

Soldier Creek is a perennial stream between Sampling Location G-1, and the Anderson Reservoir diversion. The reach above G-1 is intermittent, with springs contributing small quantities of water that maintain portions of the stream before the water is consumed by evaporation and infiltration. The reach between the diversion and confluence with Price River would be perennial if the water were not diverted for irrigation during the low-flow period.

## Pine Creek

The headwaters of Pine Creek are located in the area between the Book Cliffs and the Roan Cliffs near the northeastern part of the CIA. The creek flows in a generally westward direction for 4.1 miles until it discharges into Soldier Creek, 120 ft below Surface Water Sampling Location G-3 (Plate 1). The combined streams continue to Price River in the same manner as described for Soldier Creek.

The drainage area above contains 3.5 miles<sup>2</sup>, with an average altitude of 7,943 ft. The stream channel is narrow, 2 to 6 ft, for most of its length, and is on alluvium, except for occasional outcrops of bedrock. The average gradient of the stream channel is 9%, and the average gradient of the land surface is 21%.

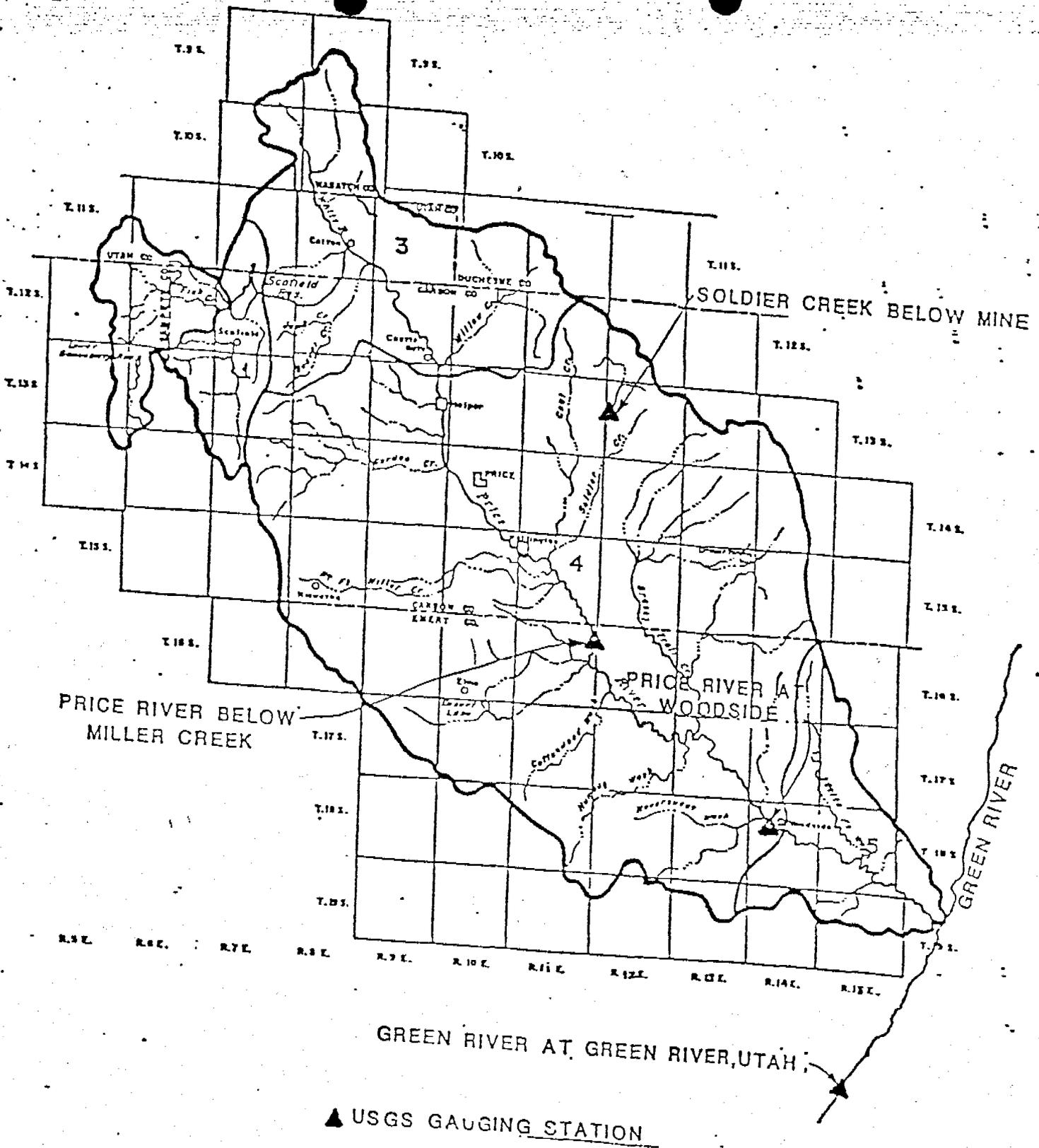
DRAINAGE SUB-BASINS WITHIN LIFE OF MINE AREA  
AND ADJACENT AREAS

<u>SUB-BASIN</u>	<u>AREA</u> <u>(mi<sup>2</sup>)</u>	<u>AREA</u> <u>(ac)</u>	<u>MEAN ANNUAL PRECIP.</u> <u>(in.)</u>	<u>PRECIP.</u> <u>(ft)</u>	<u>ACRE/</u> <u>ft</u>
I	6.0	3,867	15	1.25	4,834
II	5.4	3,422	15	1.25	4,278
III	1.6	1,044	16	1.33	1,389
IV	1.9	1,235	16	1.33	1,643
V	2.6	1,689	14	1.17	1,976
VI	5.5	3,540	14	1.17	4,142
VII	1.3	821	16	1.33	1,092
					19,354

Total Precipitation on sub-basins within proposed LOM area and adjacent areas = 19,354 ac/ft.

19,354 ac/ft x 5% (estimated recharge) = 967.7 ac/ft.

TABLE 2 .



Source: Utah Division of Water Resources, 1975

Hydrologic sub areas

Price River drainage

Figure 4

Pine Creek contains water throughout its length most of the time. However, during periods of unusually low precipitation, there are dry reaches between the springs that feed the stream. Such a dry period occurred in the summer of 1977 when there was no flow at G-3 observed during three visits.

Water quality in Pine Creek, is good to excellent at G-3, with specific conductance varying from 420 to 720 mmhos/cm at 25°C. Values for most samples are on the order of 530 mmhos/cm. The water is predominantly a calcium bicarbonate type but a couple of samples showed high levels of sodium sulfate. The pH varied from 7.9 to 8.5. Suspended solid levels were generally low, except during spring snowmelt when concentrations were greater than 450 mg/l.

Water quality in Soldier Creek just below its confluence with Pine Creek (Surface Water Sampling Location G-4) is similar to that in Pine Creek. The watershed upstream of G-4 includes sub-basins I-IV, which contain an area of about 14.9 miles<sup>2</sup>. TDS concentrations vary from 338 mg/l to 860 mg/l with most being between 500 and 600 mg/l. The dominant constituents are calcium and bicarbonates. The pH varied from 7.7 to 8.7 with most measurements being greater than 8.0. High levels of suspended solids occur annually during snowmelt events, but typical levels are less than 70 mg/l.

Water quality was measured at Surface Water Sampling Location G-5 by both Soldier Creek Coal Company and USGS. The USGS data do not reflect as much variability as the data obtained by Soldier Creek Coal Company. TDS varied from 220 to 1,566 mg/l, with the higher concentrations generally occurring during summer months when flows were low. Most TDS concentrations were between 400 and 700 mg/l. The dominant constituents were calcium bicarbonates; however, the poorer quality samples showed increases of bicarbonates of sodium and calcium with some increase in sulfates. The pH level varies from 7.5 to 8.7 with most levels being between 7.8 and 8.2. Suspended solid concentrations were generally less than 60 mg/l, with higher levels occurring during spring and early summer.

Water in the vicinity of the Soldier Canyon Mine is typical of the regional environment. A comparison of these data with Table 3 indicates that the quality of Soldier Creek water near the mine is much better than the quality of Price River water.

## VI. Potential Hydrologic Impacts

### A. Groundwater

Dewatering and subsidence related to mining have the greatest potential for impacting groundwater resources in the CIA.

SUMMARY OF SELECT WATER QUALITY DATA FROM USGS STATIONS  
PRICE RIVER AT WOODSIDE AND GREEN RIVER AT GREEN RIVER, UTAH

STATION NUMBER	STATION NAME	WATER YEAR	SPECIFIC CONDUCTANCE (micro-mhos)	pH (units)	TEMPERATURE (deg. C)	DISSOLVED SOLIDS RESIDUE at 180 (deg. C)	CALCIUM Ca	MAGNESIUM Mg	SODIUM Na	POTASSIUM K	CHLORIDE Cl	SULFATE SO <sub>4</sub>	BICARBONATE HCO <sub>3</sub>	IRON		MANGANESE		SUSPENDED SOLIDS	
														TOTAL Fe	DISSOLVED Fe	TOTAL Mn	DISSOLVED Mn		
09311500	Price River at Woodside	1975-76	Min. 2,200	8.2	.0	1,070	170	85	230	7.0	31	1,000	260	-	-	-	-	-	4
			Max. 4,950	8.0	26.5	4,830	310	250	730	12.0	78	2,000	530	-	-	-	-	-	5,490
		1976-77	Min. 1,370	7.4	.0	1,150	220	16	77	7.0	15	600	170	440	10	-	-	-	11
			Max. 6,950	8.7	29.0	6,770	400	350	1,100	15.0	130	4,300	570	510,000	70	16,000	110	-	11
		1977-78	Min. 1,140	7.6	.0	1,290	110	79	190	4.0	22	640	40	10	10	90	10	-	27
			Max. 6,090	8.7	26.0	4,990	330	280	760	13.0	100	3,100	450	18,000	20	860	60	-	4,420
		1978-79	Min. 1,110	8.0	-	822	83	51	110	3.4	17	390	240	280	-	10	-	-	16
			Max. 6,540	8.6	21.5	6,240	250	320	990	17.0	110	3,700	500	46,000	-	1,300	20	-	5,540
		1979-80	Min. 1,090	8.0	.0	761	-	-	-	-	-	-	270	-	0	-	-	-	93
			Max. 5,510	8.7	23.0	5,660	-	-	-	-	-	-	520	-	63,000	-	2,600	10	-
		1980-81	Min. 2,720	8.0	.0	2,070	150	130	300	7.2	52	1,300	160	-	-	-	-	-	8
			Max. 4,480	8.3	24.0	3,860	250	230	640	12.0	96	2,500	330	-	-	-	-	-	8
1981-82	Min. 1,170	8.0	.0	830	82	53	97	2.9	16	360	194	9,600	-	240	-	-	158		
	Max. 4,080	8.3	23.5	2,880	240	210	530	8.3	90	2,100	350	24,000	-	820	-	-	23,800		
1982-83	Min. 830	8.2	.0	830	82	53	97	2.3	17	210	210	-	-	-	-	-	110		
	Max. 3,920	8.4	20.0	3,500	260	220	520	8.9	79	2,200	340	36,000	-	960	-	-	12,300		
09315000	Green River at Green River	1975-76	Min. 450	8.1	.0	276	41	15	30	1.0	7.7	110	150	570	0	30	0	32	
			Max. 1,030	8.7	26.0	704	82	35	110	3.3	35	300	270	32,000	60	1,000	20	3,403	
		1976-77	Min. 530	7.7	.0	335	49	19	44	2.1	15	150	160	1,300	0	30	0	33	
			Max. 1,520	8.7	29.0	1,210	190	43	110	7.0	33	670	300	330,000	190	7,600	20	18,300	
		1977-78	Min. 300	7.8	.0	212	33	12	23	1.0	7.4	69	190	1,700	10	50	0	5	
			Max. 1,070	8.5	28.5	756	81	39	120	3.5	38	350	270	21,000	40	630	10	13,400	
		1978-79	Min. 300	8.0	.0	273	35	15	29	-	8	86	-	830	0	40	0	49	
			Max. 1,240	8.5	28.0	852	87	42	110	9.5	41	390	330	19,000	120	500	0	47,500	
		1979-80	Min. 320	7.6	.0	214	29	12	31	1.5	7.4	70	130	2,000	<10	50	1	60	
			Max. 1,310	8.5	27.0	798	85	37	110	5.0	38	410	260	39,000	40	1,100	10	11,600	
		1980-81	Min. 320	7.8	.0	273	47	19	50	1.8	14	160	110	1,300	<10	40	1	19	
			Max. 1,200	8.3	26.0	852	82	41	110	3.7	40	350	190	27,000	30	800	10	5,780	
1981-82	Min. 290	8.0	.0	196	29	10	19	0.6	6	60	90	10,000	5	210	<1	134			
	Max. 1,060	8.4	27.5	749	82	40	100	3.3	37	320	180	31,000	20	840	6	16,700			
1982-83	Min. 400	8.0	.0	494	38	15	29	-	9.3	98	111	-	6	-	3	64			
	Max. 960	8.4	25.0	584	69	32	76	-	25	270	184	-	31	-	130	5,650			

Notes: Station locations: see Figure 3.2-6 (Price River Drainage Basin). Constituents: in mg/l except manganese and iron, which are in micrograms/l. Specific conductance: field determination. pH: field determination.

## Dewatering

Underground mining removes the support to overlying rock causing caving and fracturing of the overburden. In areas where fracturing is extensive subsidence of the overburden becomes greater. Subsidence induced caving and fracturing can expose ground water sources to lower pressures creating conduits of less resistance that allow groundwater to flow into the mine. Dewatering from fracturing may decrease aquifer storage and flow to streams and springs (Figure 5).

Currently, the volume of water being discharged from the mine (130 gpm) does not reflect the amount of water that is currently being withdrawn from the groundwater system. The withdrawal value may be somewhat less since SCCC is dewatering an area that has been sealed off. At the rate of 130 gpm an annual volume of 210 ac-ft would be discharged. This figure is significantly larger than the 15 ac-ft per year reported by Waddel 1986 for the year 1980.

Average groundwater recharge is estimated to be 967.7 ac-ft using 5% as the average infiltration factor. Total groundwater storage was estimated by SCCC to be 490,00 ac-ft.

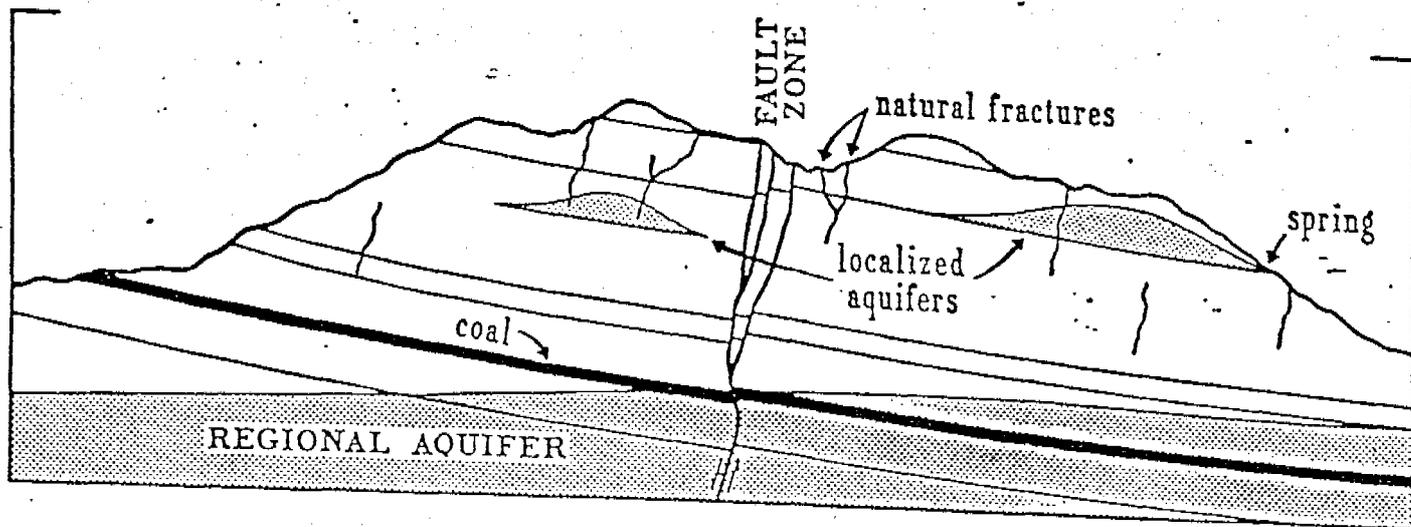
Future monitoring will indicate the total groundwater discharge due to mining. Even at the current rate of 130 gpm only a small portion of the annual groundwater recharge source will be intercepted.

It is not anticipated that the rate of discharge will exceed the recharge rate during this permit term. However, as mine operations expand in the future to encompass the proposed expansion area an increase in discharge is anticipated. At present, data are not available to precisely document increases in mine discharge. An estimate of discharge increase may be derived by multiplying the discharge per acre of present mine workings times the projected area of mine working.

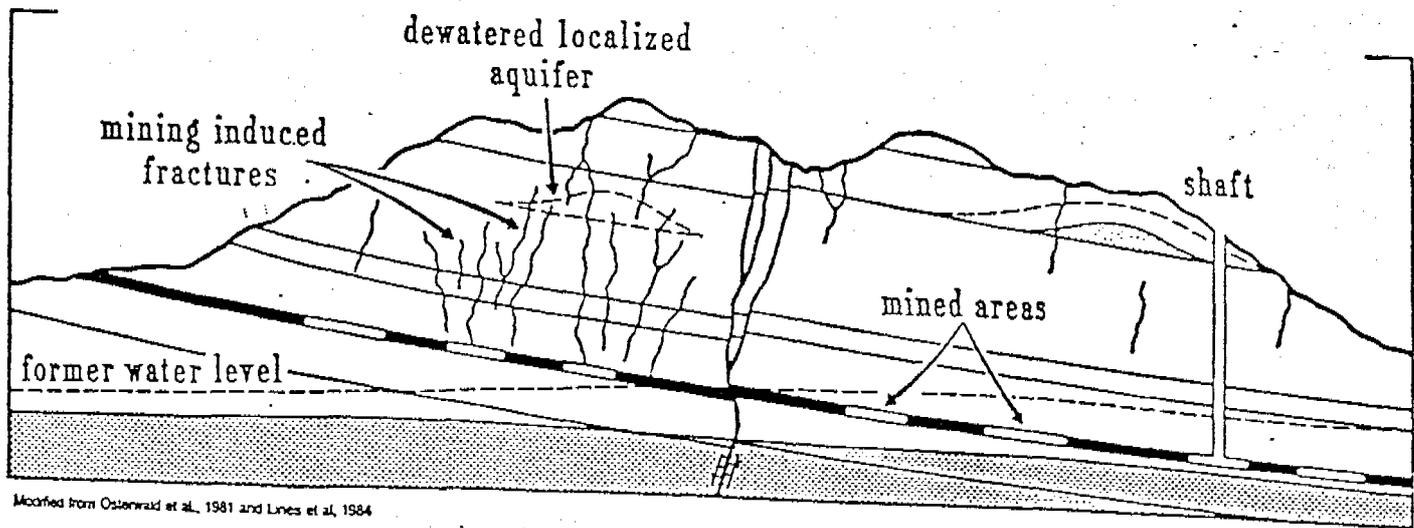
Upon termination of mining operations, groundwater discharge to Soldier Creek will be discontinued and the mine will begin to flood. The potential reduction in surface flow that is associated with the cessation of operations may be evaluated in terms of the lag time required for reestablishment of base flow recharge.

The impact associated with the reduction in surface flow is considered temporary. Mine flooding will conceivably reestablish a system of base flow recharge that was operational prior to mining. The time span required for reestablishing base flow recharge may be estimated by dividing the final mine workings volume by the final estimated values for mine discharge.

### A. Before Mining



### B. Following Mining



Modified from Osterwald et al., 1981 and Lines et al., 1984

Figure 5. Potential effects of mining to overlying aquifers and strata.

The maximum lag time for mine flooding will depend on the amount of caving and the void space created from caving. Estimates can be made by making certain assumptions however, without more information the estimates would be confussing. It should be noted that complete flooding may never be achieved because the hydraulic head generated as flooding expands will also increase until the hydraulic properties of the roof, floor and rib are exceeded and flow through the rocks is initiated.

In most mining areas it is unlikely that fractures will reach perched aquifers do to the thickness of the overburden. Dewatering of any aquifers will result in inmine flow which is discharged to Soldier Creek. Water quality downstream from the mine could improve since water being discharged is of better quality than natural streamflow.

SCCC has proposed an inmine water monitoring plan that will be dynamic in nature to allow for monitoring new sites as mining progresses. The proposed groundwater monitoring sites program for SCCC will, in the future, allow increasing discharge rates to be more precisely characterized and thereby, achieve a more accurate assessment of mining related dewatering impacts.

### Subsidence

Subsidence impacts are largely related to extension and expansion of the existing fracture system and upward propagation of new fractures (Figure 6). 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 groundwater residence time and potentially improve water quality.

No subsidence has been recorded over the current mine permit area. The presence of the Castlegate Sandstone in conjunction with overburden thickness is apparently responsible for reduced surface subsidence. Additional mining during the five-year permit term will occur beneath 500-2,000 feet of overburden. The potential for subsidence related surface impacts (e.g., ponding) to the subsurface and surface hydrologic regimes are not considered significant. The operator is currently drafting plans to implement an aerial subsidence survey on an annual basis using the photogrammetric method. Annual subsidence reports will be generated and provided to the regulatory authority.

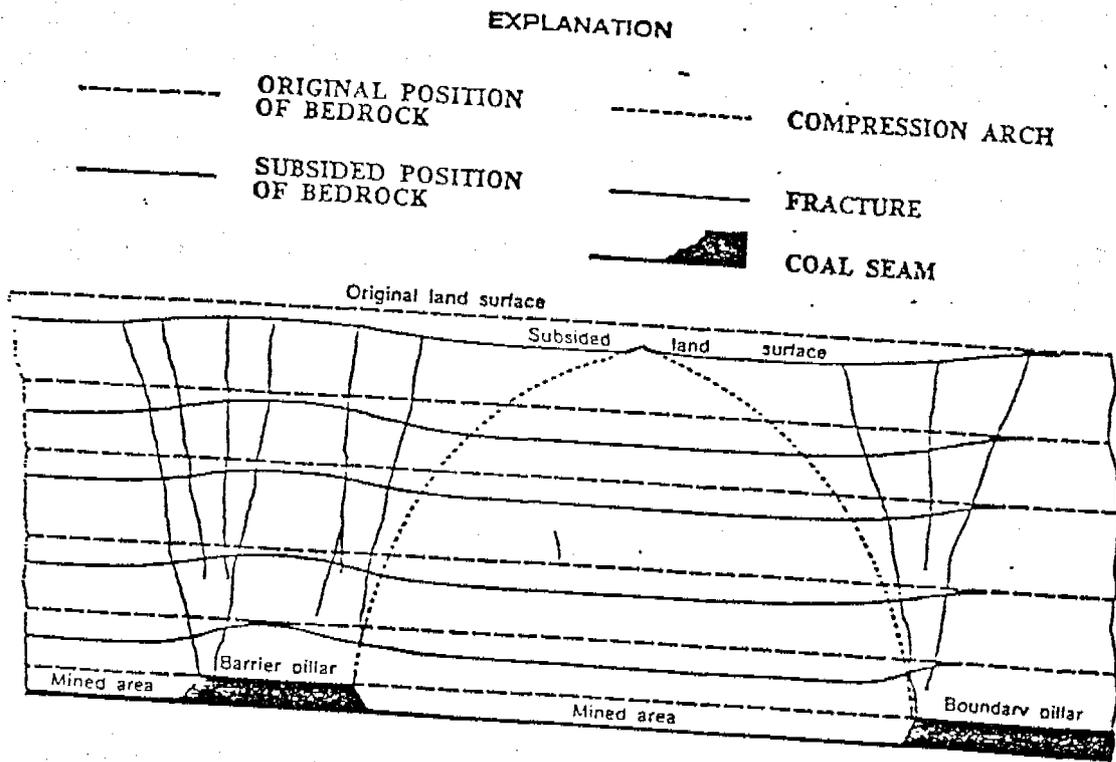


Figure 6. Generalized cross section showing subsidence and fracturing that occurs above an underground coal mine (From Dunrud, 1976)

Mine water is presently directed to a sediment pond and then released to Soldier Creek at NPDES discharge point #003. The treatment associated with these ponds improves suspended solids and oil and grease parameter values, but overall total dissolved solids (TDS) values remain in the range of 1500 mg/l at the discharge point. Future impacts from mine water discharge is not anticipated to increase from present levels. The quantity of mine water may increase, causing increased TDS levels downstream and suspended solid values will decrease as sediment controls are implemented in problem areas.

## B. Surface Water

An NPDES permit issued by EPA presently allows for one ton of dissolved solids per day to be discharged from the mine into Soldier Creek. Continuation of Soldier Creek Coal Company's monitoring program will verify water consumption and discharge estimates.

The quality of the local surface waters can be changed by two basic processes. First, the runoff from the operator's disturbed lands and waste piles could increase sediment concentrations and alter the distribution and concentration of dissolved solids in the receiving streams. This potential for inducing water quality changes has been fully recognized, and the runoff control plan established for the mine is adequate in anticipating, mitigating and monitoring the potential impacts. The second potential cause of surface water quality changes is related to the location and water chemistry of groundwater discharges, both natural and planned by the operator.

As discussed by Waddell et al (1986), the perennial flow of Soldier Creek is sustained by spring or seepage discharges from the various sedimentary formations. This perennial flow is dominated by the high volume of spring discharges from the Flagstaff Limestone during spring and early summer snowmelt. At other times of the year, the discharge contributions from the Flagstaff Limestone is greatly reduced and seepage from the underlying formations sustains the base flow of the stream. Generally, the total dissolved solids (TDS) concentration of spring water emanating from the Flagstaff Limestone is lower than the TDS of the underlying groundwater in the North Horn and Blackhawk Formations. As presented by Waddell et al (1986), the upper segment of the stream flow in Pine Creek contains water which emanates from the Flagstaff Limestone, possesses a TDS of 300 to 400 mg/l, and is dominated by the ions of magnesium, calcium and bicarbonate. In contrast, the lower reaches of Soldier Creek, which receives seepage contributions from the North Horn, Price River, Castlegate and Blackhawk Formations, has a TDS ranging from about 500 to 600 mg/l and is dominated by the ions of sodium, magnesium and sulfate.

To qualitatively address the possible consequences of mining upon the quality of the surface flows of Soldier Creek is both a spatial and temporal problem. During periods of high discharge caused by summer thunderstorm precipitation or snowmelt, the effects of redistributing seepage contributions and direct mine discharge to the stream are negligible in respect to the natural processes of sediment transport and controlling water chemistry. During other periods, however, the lessening of seepage contributions caused by the redistribution of flow by the underground workings will cause the water quality of the upper reaches of the drainage network to become more dominant farther downstream, even though the baseflow would be less.

At and below the point of mine discharge, the overall effect of constantly disposing groundwater from the mine workings is one of adjusting the water chemistry to one dominated by the groundwater quality of the Blackhawk Formation. At periods of low base flow, there would appear to be little variation between the water quality of the natural stream flow and the mine discharge. Obviously, the mine discharge would result in a higher rate of flow in the stream than normally experienced during dry periods when the stream is normally sustained by limited spring contributions.

Waddell et al (1986) describe the stream bed characteristics of Soldier Creek in some detail. Due to the apparent saturation of the natural waters with respect to calcite, the bed of Soldier Creek downstream from Pine Canyon contains alluvium which is cemented with carbonate precipitates. It is possible that the degree of this cementation may increase as a result of mining due to the possible dominance of the calcium bicarbonate waters in the stream flow should the waters of the formations underlying the Flagstaff Limestone be redistributed and diverted downstream. Wadedell et al (1986) suggested that the diversity of benthic invertebrates may be affected by the cementation process.

### C. Alluvial Valley Floors

A negative determination has been made based on the studies of conducted by Sunedco Coal Company to the approved Sage Pint-Dugout Canyon mine plan on the existance of unconsolidated streamlaid deposits holding streams and sufficient water to support agricultural activities within the mine plan area. A potential AVF exists downstream along Soldier Creek.

## VII. Summary

The probable hydrologic impacts are summarized below under the headings entitled First Five Year Permit Term and Future Mining.

### First Five Year Permit Term

The rate of dewatering will remain significantly less than the estimated recharge rate during the first five year permit term. Overburden thickness will be sufficient (500-2,000 feet) to restrict surface manifestations of subsidence. The subsurface propagation of fractures may produce changes in groundwater flow that could affect localized aquifers and springs. Future monitoring will provide data applicable to documenting changes in the groundwater system.

Surface disturbance and the addition of mine water have not significantly degraded water quality in Soldier Creek. Sediment control measures have served to reduce contaminants and stabilize water quality at acceptable levels.

NO AVF will be impacted during the first five year permit term by additional flow from increased mine water discharge.

### Future Mining

Increased rates of dewatering may, in the future, result in depletion of groundwater storage. Depletion of storage may terminate certain spring flow and base flow recharge to streams. Upon cessation of mining, mine water discharge to Soldier Creek will be discontinued. However, this affect is considered temporary because mine flooding will probably result in reestablishment of the preexisting groundwater system that, most likely, provided base flow recharge.

Drainage from future surface disturbance will be managed through appropriate sediment controls. Future mine discharge will be directed through the existing sediment pond.

At the termination of mining, the downstream AVF will experience decreased flow. The duration and extent of this impact cannot be accurately assessed at this time. However, flow rates may be partially to fully restored when the groundwater system is reestablished.

The operational design proposed for the Soldier Canyon Mine is herein determined to be consistent with preventing damage to the hydrologic balance outside the mine plan area based on the accuracy of the information submitted in the mine plan and referenced literature.

REFERENCES

- Anderson, Paul B., 1983. Geology Map of the Pine Canyon Quadrangle, Carbon County, Utah. Utah Geological and Mineral Survey, Map 72.
- Danielson, T. W., and Sylla, D. A. 1983. Hydrology of coal-resource areas in southern Wasatch Plateau, Central Utah: U. S. Geol. Surv., Water-Resource Investigations Report 82-4009.
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- Kaiser Coal Corporation, Application for an Underground Coal Mine Permit, March 1, 1985, Sunnyside Mine, Sunnyside, Utah.
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- Simons, Li and Associates, Inc. 1984. Cumulative hydrologic impact assessment Huntington Creek basin, Emery County, Utah: Prepared for Office of Surface Mining, Project UT-OSM-06.
- Price, D. and Waddell, K.M., 1973. Selected hydrologic data in the Upper Colorado River Basin, U.S. Geo. Sur. Hydro. Invest. Atlas HA-477, Washington, D. C.
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Waddell, K. M., et al. 1982. Selected hydrologic data, Price River Basin, Utah, water years 1979 and 1980: U. S. Geol. Surv., Utah Hydrologic Data Report No. 38, Open-File Report 82-916.

Waddell, K. M. et al. 1986. Hydrology of the Price River Basin, Utah, with emphasis on selected coal-field areas. U. S. Geol. Surv., Water Supply Paper 2246.

Winget, R. N. 1980. Aquatic resource analysis of Grassy Trail Creek, Carbon County, Utah

1098R

Updated January 1991

## RECLAMATION AGREEMENT

(COAL)

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AFFIDAVITS OF QUALIFICATION

POWER OF ATTORNEY

Permit Number: ACT/007/018  
Date Permit Issued: 2/3/87  
Effective Date of Agreement: 5-2-91

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

COAL RECLAMATION AGREEMENT  
-ooOOoo-

For the purposes of this RECLAMATION AGREEMENT the terms below are defined as follows:

"PERMIT": (Mine Permit No.) ACT/007/018 (County) Carbon

"MINE": (Name of Mine) Soldier Canyon Mine

"PERMITTEE": (Company or Name) Soldier Creek Coal Company  
(Address) P.O. Box I  
Price, UT 84501

"PERMITTEE'S REGISTERED AGENT": (Name) C.T. Corporation System  
(Address) 1360 South Main Street  
(Phone) Salt Lake City, UT 84101  
(801) 531-7090

"COMPANY OFFICERS": R.W. Olsen - President  
J.E. Braby - Assistant Secretary

"BOND TYPE": (Form of Bond) Surety

"BOND": (Bond Amount-Dollars) \$1,940,000 - 1991 Dollars  
(Escalated Year-Dollars)

"INSTITUTION": (Bank or Agency) Federal insurance Co  
POLICY OR ACCOUNT NUMBER 8107-37-63

"LIABILITY INSURANCE": (Exp.) Until cancelled  
(Insurance Company) Alexander & Alexander

"STATE": Utah (Department of Natural Resources)

"DIVISION": Division of Oil, Gas and Mining

"DIVISION DIRECTOR" Dianne R. Nielson

EXHIBITS:

	Revision Dates
"SURFACE DISTURBANCE"	Exhibit "A" _____
"BONDING AGREEMENT"	Exhibit "B" _____
"LIABILITY INSURANCE"	Exhibit "C" _____
"STIPULATION TO CHANGE BOND"	Exhibit "D" _____

## RECLAMATION AGREEMENT

This RECLAMATION AGREEMENT (hereinafter referred to as "Agreement") is entered into by the Permittee.

WHEREAS, on February 3, 19 87, the Division approved the Permit Application Package, hereinafter "PAP", submitted by Soldier Creek Coal Company, hereinafter "Permittee"; and

WHEREAS, prior to issuance of a permit to conduct mining and reclamation operations on the property described in the PAP, hereinafter "Property", the Permittee is obligated by Title 40-10-1, et seq., Utah Code Annotated (1953, as amended), hereinafter "Act", to file with the Division a bond ensuring the performance of the reclamation obligations in the manner and by the standards set forth in the PAP, the Act, and the State of Utah Division of Oil, Gas and Mining Rules pertaining to Coal Mining and Reclamation Activities, hereinafter "Rules"; and

WHEREAS, the Permittee is ready and willing to file the bond in the amount and in a form acceptable to the Division and to perform all obligations imposed by the Division pursuant to applicable laws & regulations relating to the reclamation of the Property; and

WHEREAS, the Division is ready and willing to issue the subject a mining and reclamation permit upon acceptance and approval of the bond.

NOW, THEREFORE, the Division and the Permittee agree as follows:

1. The provisions of the Act and the Rules are incorporated by reference herein and hereby made a part of this Agreement. Provisions of the Act or Rules shall supersede conflicting provisions of this Agreement.
2. The Permittee agrees to comply with all terms and provisions of the PAP, the Act and the Rules, including the reclamation of all areas disturbed by surface coal mining and reclamation operations despite the eventuality that the cost of actual reclamation exceeds the bond amount.
3. The Permittee agrees to provide a legal description of the property including the number of acres approved by the Division to be disturbed by surface mining and reclamation operations during the permit period. The description is attached as Exhibit "A", and is incorporated by reference and shall be referred to as the "Surface Disturbance".
4. The Permittee agrees to provide a bond to the Division in the form and amount acceptable to the Division ensuring the performance of the reclamation obligations in the manner and by the standards set forth in the PAP, the Act and the Rules. Said bond is attached as Exhibit "B" and is incorporated by reference.

## RECLAMATION AGREEMENT

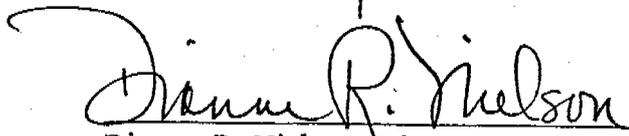
5. The Permittee agrees to maintain in full force and effect the public liability insurance policy submitted as part of the permit application. The Division shall be listed as an additional insured on said policy.
6. In the event that the Surface Disturbance is increased through expansion of the coal mining and reclamation operations or decreased through partial reclamation, the Division shall adjust the bond as appropriate.
7. The Permittee does hereby agree to indemnify and hold harmless the State of Utah and the Division from any claim, demand, liability, cost, charge, or suit initiated by a third party as a result of the Permittee or Permittee's agent or employees failure to abide by the terms and conditions of the approved PAP and this Agreement.
8. The terms and conditions of this Agreement are non-cancelable until such time as the Permittee has satisfactorily, as determined by the Division, reclaimed the Surface Disturbance in accordance with the approved PAP, the Act, and the Rules. Notwithstanding the above, the Division may direct, or the Permittee may request and the Division may approve, a written modification to this Agreement.
9. The Permittee may, at any time, submit a request to the Division to substitute the bonding method. The Division may approve the substitution if the bond meets the requirements of the Act and the Rules, but no bond shall be released until the Division has approved and accepted the replacement bond.
10. Any revision in the Surface Disturbance, the bond amount, the bond type, the liability insurance amount coverage, and/or the liability insurance company, or other revisions affecting the terms and conditions of this Agreement shall be submitted on the form entitled "Stipulation to Revise Reclamation Agreement" and shall be attached hereto as Exhibit "D" (other exhibits as appropriate).
11. This Agreement shall be governed and construed in accordance with the laws of the state of Utah. The Permittee shall be liable for all reasonable costs incurred by the Division to enforce this agreement.
12. Any breach of the provisions of this Agreement, the Act, the Rules, or the PAP may, at the discretion of the Division, result in an order to cease coal mining and reclamation operations, revocation of the Permittee's permit to conduct coal mining and reclamation operations and/or forfeiture of the bond.

RECLAMATION AGREEMENT

13. In the event of forfeiture, the Permittee agrees to be liable for additional costs in excess of the bond amount which may be incurred by the Division in order to comply with the PAP, the Act, and the Rules. Any excess monies resulting from the forfeiture of the bond amount upon compliance with this contract shall be refunded to the appropriate party.
14. Each signatory below represents that he/she is authorized to execute this Agreement on behalf of the named party. Proof of such authorization is provided on a form acceptable to the Division and is attached hereto.

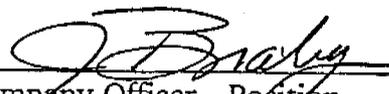
SO AGREED this 2nd day of May, 19 91

STATE OF UTAH:

  
\_\_\_\_\_  
Dianne R. Nielson, Director  
Division of Oil, Gas and Mining

PERMITTEE:

  
\_\_\_\_\_  
Company Officer - Position  
R.W. Olsen - President

  
\_\_\_\_\_  
Company Officer - Position  
J.E. Braby - Assistant Secretary

NOTE: An Affidavit of Qualification must be completed and attached to this form for each authorized agent or officer. Where one signs by virtue of Power of Attorney for a company, such Power of Attorney must be filed with this Agreement. If the Principal is a corporation, the Agreement shall be executed by its duly authorized officer.

EXHIBIT "A"  
SURFACE DISTURBANCE  
LEGAL DESCRIPTION

Revised October 1990  
Exhibit "A" - SURFACE DISTURBANCE

Permit Number: ACT/007/018  
Effective Date: April 16, 1991

SURFACE DISTURBANCE

--ooOOoo--

In accordance with the RECLAMATION AGREEMENT, the PERMITTEE intends to conduct coal mining and reclamation activities on or within the SURFACE DISTURBANCE as described hereunder:

Total acres of SURFACE DISTURBANCE: 22.8

Legal Description of SURFACE DISTURBANCE:

As per Maps attached and referred to as:

Exhibit 5.1-2 - Central Mine Disturbance

Exhibit 6.1-1 - Sewage Lagoon & Top Soil Storage Area

IN WITNESS WHEREOF the SURETY has hereunto set its signature and seal this  
16th day of April, 1991.

FEDERAL INSURANCE COMPANY

SURETY

By: J. David Emrich  
J. David Emrich

Title: Attorney-in-Fact

EXHIBIT "B"  
BONDING AGREEMENT

Surety Bond

Collateral Bond

EXHIBIT "B"

SURETY BOND  
(FEDERAL COAL)

# CHUBB GROUP OF INSURANCE COMPANIES

15 Mountain View Road, Warren, New Jersey 07060

RIDER to be attached to and form a part of  
Bond No. 8107-37-63 wherein  
FEDERAL INSURANCE COMPANY  
is named as Surety, on behalf of  
Soldier Creek Coal Company  
as Principal, in favor of State of Utah, Division of Oil, Gas and Mining,  
and the U.S. Department of the Interior, Office of Surface Mining  
as Obligee, in the sum of \$577,000.00  
dated 08/15/85 , effective 08/16/85

Permit #ACT/007/018

IT IS HEREBY UNDERSTOOD AND AGREED that effective the 16th day of April, 1991  
the penalty of this bond is INcreased  
from FIVE HUNDRED SEVENTY SEVEN THOUSAND AND 00/100 DOLLARS  
(\$577,000.00)  
to ONE MILLION NINE HUNDRED FORTY THOUSAND AND 00/100 DOLLARS  
(\$1,940,000.00)  
as to losses occurring after said effective date. Acreage amended from: 36.4 to 22.8

Provided, however, that the liability of the Principal and Surety hereon shall not be cumulative or in any event exceed the revised bond amount referred to herein.

The attached bond shall be subject to all its agreements, limitations and conditions except as herein expressly modified.

Signed, sealed and dated this 16th day of April, 19 91

If bond amount is being DECREASED sign below  
& return a copy with original signature to the  
Surety:  
ACCEPTED

By: \_\_\_\_\_  
(Signature of Obligee)  
Name:  
Title:

Soldier Creek Coal Company  
By: R.W. Olsen  
(SEAL)

Name: Reid W. Olsen  
Title: President  
FEDERAL INSURANCE COMPANY

By: J. David Emrich  
(SEAL)  
Name: J. David Emrich  
ATTORNEY-IN-FACT

POWER OF ATTORNEY

Know all Men by these Presents, That the FEDERAL INSURANCE COMPANY, 15 Mountain View Road, Warren, New Jersey, an Indiana Corporation, has constituted and appointed, and does hereby constitute and appoint James D. McMahon, Denise DuMont, Matthew E. Lubin, David Emrich, Brice R. Gamber and Alexandra S. Handago of Philadelphia, Pennsylvania-----

in its true and lawful Attorney-in-Fact to execute under such designation in its name and to affix its corporate seal to and deliver for and on its behalf as to any and all bonds or obligations (other than Bail Bonds) given or executed in the course of its business, and any instruments amending or modifying the same, and consents to the modification or alteration of any instruments referred to in said bonds or obligations.

In Witness Whereof, the said FEDERAL INSURANCE COMPANY has, pursuant to its By-Laws, caused these presents to be signed by its Vice President and Assistant Secretary and its corporate seal to be hereto affixed this 1st day of May 19 90



Richard D. O'Connor  
Assistant Secretary

FEDERAL INSURANCE COMPANY

By James D. Dixon  
James D. Dixon  
Vice President

STATE OF NEW JERSEY  
County of Somerset

SS.

this 1st day of May 19 90, before me personally came Richard D. O'Connor to me known and by me known to be Assistant Secretary of the FEDERAL INSURANCE COMPANY, the corporation described in and which executed the foregoing Power of Attorney, and the said Richard D. O'Connor being by me duly sworn, did depose and say that he is Assistant Secretary of the FEDERAL INSURANCE COMPANY and knows the corporate seal thereof; that the seal affixed to the foregoing Power of Attorney is such corporate seal and was thereto affixed by authority of the By-Laws of said Company, and that he signed said Power of Attorney as Assistant Secretary of said Company by like authority; and that he is acquainted with James D. Dixon and knows him to be the Vice President of said Company, and that the signature of said James D. Dixon subscribed to said Power of Attorney is in the genuine handwriting of said James D. Dixon and was thereto subscribed by authority of said By-Laws in the deponent's presence.



Acknowledged and Sworn to before me on the date above written.

Janet A. Scavone  
JANET A. SCAVONE Notary Public  
Notary Public, State of New Jersey  
No 2066520  
Commission Expires October 2, 1994

CERTIFICATION

STATE OF NEW JERSEY  
County of Somerset

SS.

The undersigned, Assistant Secretary of the FEDERAL INSURANCE COMPANY, do hereby certify that the following is a true excerpt from the By-Laws of the said Company as adopted by its Board of Directors on March 2, 1990 and that this By-Law is in full force and effect.

"ARTICLE XVIII.

Section 2. All bonds, undertakings, contracts and other instruments other than as above for and on behalf of the Company which it is authorized by law or its charter to execute, may and shall be executed in the name and on behalf of the Company either by the Chairman or the Vice Chairman or the President or a Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations, except that any one or more officers or attorneys-in-fact designated in any resolution of the Board of Directors or the Executive Committee, or in any power of attorney executed as provided in Section 3 below, may execute any such bond, undertaking or other obligation as provided in such resolution or power of attorney.

Section 3. All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the Vice Chairman or the President or a Vice President or an Assistant Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, Vice Chairman, President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary and the seal of the Company may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such power of attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached."

The undersigned certify that said FEDERAL INSURANCE COMPANY is duly licensed to transact fidelity and surety business in each of the States of the United States of America, District of Columbia, Puerto Rico, and each of the Provinces of Canada with the exception of Prince Edward Island; and is also duly licensed to become sole surety on bonds, undertakings, etc., permitted or required by law.

The undersigned Assistant Secretary of FEDERAL INSURANCE COMPANY, do hereby certify that the foregoing Power of Attorney is in full force and effect.

Witness my hand and the seal of said Company at Warren, N.J., this 16th day of April 19 91



[Signature]  
Assistant Secretary

EXHIBIT "C"  
LIABILITY INSURANCE

CERTIFICATE OF LIABILITY INSURANCE

Issued To:  
State of Utah  
Department of Natural Resources  
Division of Oil, Gas and Mining  
-ooOOoo-

THIS IS TO CERTIFY THAT:

Travelers Indemnity Company

(Name of Insurance Company)

One Tower Square, Hartford, Connecticut 06183

(Home Office Address of Insurance Company)

HAS ISSUED TO:

Soldier Creek Coal Company

(Name of Permittee)

Soldier Canyon Mine

(Mine Name)

ACT/007/018

(Permit Number)

CERTIFICATE OF INSURANCE:

TLJSLG-186T908-A-91

(Policy Number)

January 1, 1991

(Effective Date)

UNDER THE FOLLOWING TERMS AND CONDITIONS:

Per R614-301-890 Terms and Conditions for Liability Insurance:

- A. The DIVISION shall require the PERMITTEE to submit as part of its permit application a certificate issued by an insurance company authorized to do business in the state of Utah certifying that the applicant has a public liability insurance policy in force for the surface coal mining and reclamation operations for which the permit is sought. Such policy shall provide for personal injury and property damage protection in an amount adequate to compensate any persons injured or property damaged as a result of the surface coal mining and reclamation operations, including the use of explosives and who are entitled to compensation under the applicable provisions of state law. Minimum insurance coverage for bodily injury and property damage shall be \$300,000 for each occurrence and \$500,000 aggregate.
- B. The policy shall be maintained in full force during the life of the permit or any renewal thereof, including the liability period necessary to complete all reclamation operations under this chapter.

Revised October 1990  
CERTIFICATE OF LIABILITY INSURANCE

- C. The policy shall include a rider requiring that the insurer notify the Division whenever substantive changes are made in the policy including any termination or failure to renew.

IN ACCORDANCE WITH THE ABOVE TERMS AND CONDITIONS, and the Utah Code Annotated 40-10-1 et seq., the Insurance Company hereby attests to the fact that coverage for said Permit Application is in accordance with the requirements of the State of Utah and agrees to notify the Division of Oil, Gas and Mining in writing of any substantive change, including cancellation, failure to renew, or other material change. No change shall be effective until at least thirty (30) days after such notice is received by the Division. Any change unauthorized by the Division is considered breach of the RECLAMATION AGREEMENT and the Division may pursue remedies thereunder.

UNDERWRITING AGENT:

Charlene M. Washburn 301-547-2890  
\_\_\_\_\_  
(Agent's Name) (Phone)  
Alexander & Alexander Inc.  
\_\_\_\_\_  
(Company Name)  
111 Market Place Baltimore, MD 21202  
\_\_\_\_\_  
(Mailing Address) (City, State, Zip Code)

The undersigned affirms that the above information is true and complete to the best of his/her knowledge and belief, and that he/she is an authorized representative of the above-named insurance company. (An Affidavit of Qualification must be completed and attached to this form for each authorized agent or officer.)

Charlene M. Washburn 4/11/91 Assistant Vice President  
(Date, Signature and Title of Authorized Agent of Insurance Company)

Signed and sworn before me by Charlene M. Washburn

this 11th day of April, 1991.

Margaret L. Lowich  
(Signature)

My Commission Expires: October 1st, 1993  
(Date)

AFFIDAVIT OF QUALIFICATION  
INSTITUTION (Bank or Agency)

--ooOOoo--

I, Charlene M. Washburn, being first duly sworn under oath,  
deposes and says that he/she is the (~~officer~~ or agent) \_\_\_\_\_  
of Travelers Indemnity Company; and that he/she is duly authorized to  
execute and deliver the foregoing obligations; and that said INSTITUTION (Bank or  
Agency) is authorized to execute the same and has complied in all respects with the  
laws of Utah in reference to commitments, undertakings and obligations herein.

(Signed) Charlene M. Washburn, agent  
Name - Position

Subscribed and sworn to before me this 11th day of April, 1991.

Margaret G. Lowich  
Notary Public

My Commission Expires:

Oct. 1st, 1993.

Attest:

STATE OF Maryland )  
City Baltimore ) SS:  
COUNTY OF Baltimore )

AFFIDAVITS OF QUALIFICATION







POWER OF ATTORNEY

POWER OF ATTORNEY

Know all Men by these Presents, That the FEDERAL INSURANCE COMPANY, 15 Mountain View Road, Warren, New Jersey, an Indiana Corporation, has constituted and appointed, and does hereby constitute and appoint James D. McMahon, Denise DuMont, Matthew E. Lubin, David Emrich, Brice R. Gamber and Alexandra S. Handago of Philadelphia, Pennsylvania-----

Know its true and lawful Attorney-in-Fact to execute under such designation in its name and to affix its corporate seal to and deliver for and on its behalf as to any and otherwise, bonds or obligations (other than Bail Bonds) given or executed in the course of its business, and any instruments amending or altering the same, and consents to the modification or alteration of any instruments referred to in said bonds or obligations.

In Witness Whereof, the said FEDERAL INSURANCE COMPANY has, pursuant to its By-Laws, caused these presents to be signed by its Vice President and Assistant Secretary and its corporate seal to be hereto affixed this 1st day of May 19 90



Richard D. O'Connor Assistant Secretary

FEDERAL INSURANCE COMPANY By

James D. Dixon Vice President

STATE OF NEW JERSEY } ss. County of Somerset

this 1st day of May 19 90 before me personally came Richard D. O'Connor to me known and by me known to be Assistant Secretary of the FEDERAL INSURANCE COMPANY, the corporation described in and which executed the foregoing Power of Attorney, and the said Richard D. O'Connor being by me duly sworn, did depose and say that he is Assistant Secretary of the FEDERAL INSURANCE COMPANY and knows the corporate seal thereof; that the seal affixed to the foregoing Power of Attorney is such corporate seal and was thereto affixed by authority of the By-Laws of said Company, and that he signed said Power of Attorney as Assistant Secretary of said Company by like authority; and that he is acquainted with James D. Dixon and knows him to be the Vice President of said Company, and that the signature of said James D. Dixon subscribed to said Power of Attorney is in the genuine handwriting of said James D. Dixon and was thereto subscribed by authority of said By-Laws in deponent's presence.



Acknowledged and Sworn to before me on the date above written.

Janet A. Scavone Notary Public, State of New Jersey No 2066520 Commission Expires October 2, 1994

CERTIFICATION

STATE OF NEW JERSEY } ss. County of Somerset

I, the undersigned, Assistant Secretary of the FEDERAL INSURANCE COMPANY, do hereby certify that the following is a true excerpt from the By-Laws of the said Company as adopted by its Board of Directors on March 2, 1990 and that this By-Law is in full force and effect.

"ARTICLE XVIII.

Section 2. All bonds, undertakings, contracts and other instruments other than as above for and on behalf of the Company which it is authorized by law or its charter to execute, may and shall be executed in the name and on behalf of the Company either by the Chairman or the Vice Chairman or the President or a Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations, except that any one or more officers or attorneys-in-fact designated in any resolution of the Board of Directors or the Executive Committee, or in any power of attorney executed as provided for in Section 3 below, may execute any such bond, undertaking or other obligation as provided in such resolution or power of attorney.

Section 3. All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the Vice Chairman or the President or a Vice President or an Assistant Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, Vice Chairman, President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary and the seal of the Company may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such power of attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached."

I, the undersigned, Assistant Secretary of FEDERAL INSURANCE COMPANY, do hereby certify that said FEDERAL INSURANCE COMPANY is duly licensed to transact fidelity and surety business in each of the States of the United States of America, District of Columbia, Puerto Rico, and each of the Provinces of Canada with the exception of Prince Edward Island; and is also duly licensed to become sole surety on bonds, undertakings, etc., permitted or required by law.

I, the undersigned Assistant Secretary of FEDERAL INSURANCE COMPANY, do hereby certify that the foregoing Power of Attorney is in full force and effect.

Witness my hand and the seal of said Company at Warren, N.J., this 16th day of April 19 91



Assistant Secretary





PUBLIC NOTICE  
APPLICATION FOR SIGNIFICANT PERMIT REVISION

Notice is hereby given that Soldier Creek Coal Company, Soldier Canyon Mine, P.O. Box 1, Price, Utah 84501, on February 6, 1991 submitted a complete application for permit revision, to increase the permit area for the storage of topsoil, to the State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining under the provisions of the Utah Coal Mining and Reclamation Act (Utah Code Annotated 40-10-1 et seq.) and the Utah R614 Coal Mining Rules. The presently approved permit is Permit No. ACT/007/018. The permit area is located approximately 9 miles north of U.S. Highway 6 & 50, on State Highway 53. The revised area is outside Soldier Creek Coal Company's currently approved permit area.

A complete copy of the application for permit revision is available for public inspection at the Carbon County Recorder's Office in Price, Utah.

Soldier Creek Coal Company intends on constructing an access road on the west side of State Highway 53. The access road will be approximately 100 feet long and allow for the construction and use of the facility within the proposed permit area. Construction of the access road and topsoil storage site is estimated to commence on April 5, 1991, and be completed by May 1, 1991. Ingress and egress on State Highway 53 by the public, will be maintained throughout the construction period.

The Topsoil Storage Facility area is contained on the U.S.G.S. 7.5 minute quadrangle maps.

Deadman Canyon  
Pine Canyon

A legal description of the land involved in Soldier Creek Coal Company's proposed permit is as follows:

Beginning at a point on the West R-O-W line of Highway 53, which point is South 104.65 ft. and West 1,836.53 ft. from the East ¼ corner of Section 25, Township 13 South, Range 11 East, S.L. B & M.; and running thence West 30.00 ft.; thence North 265.00 ft.; thence S 82° 15'W, 329.50 ft.; thence S 40°W 122.14 ft.; thence South 480.00 ft.; thence East 90.00 ft.; thence N 49° 05'09"E 416.84 ft.; thence North 30 ft.; thence East 30.00 ft; thence North 50.00 ft. to the point of Beginning.

Containing 4.50 Acres.

Written comments must be submitted within thirty (30) days from the last date of publication of this notice, March 5, 1991. Written comments, objections, or requests for public hearing or an informal conference concerning this Application for Significant Permit Revision may be submitted to:

State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining, 3 Triad Center, Suite 350, 355 W. North Temple, Salt Lake City, Utah 84180-1203.

PLICATION

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DIVISION OF  
OIL GAS & MINING

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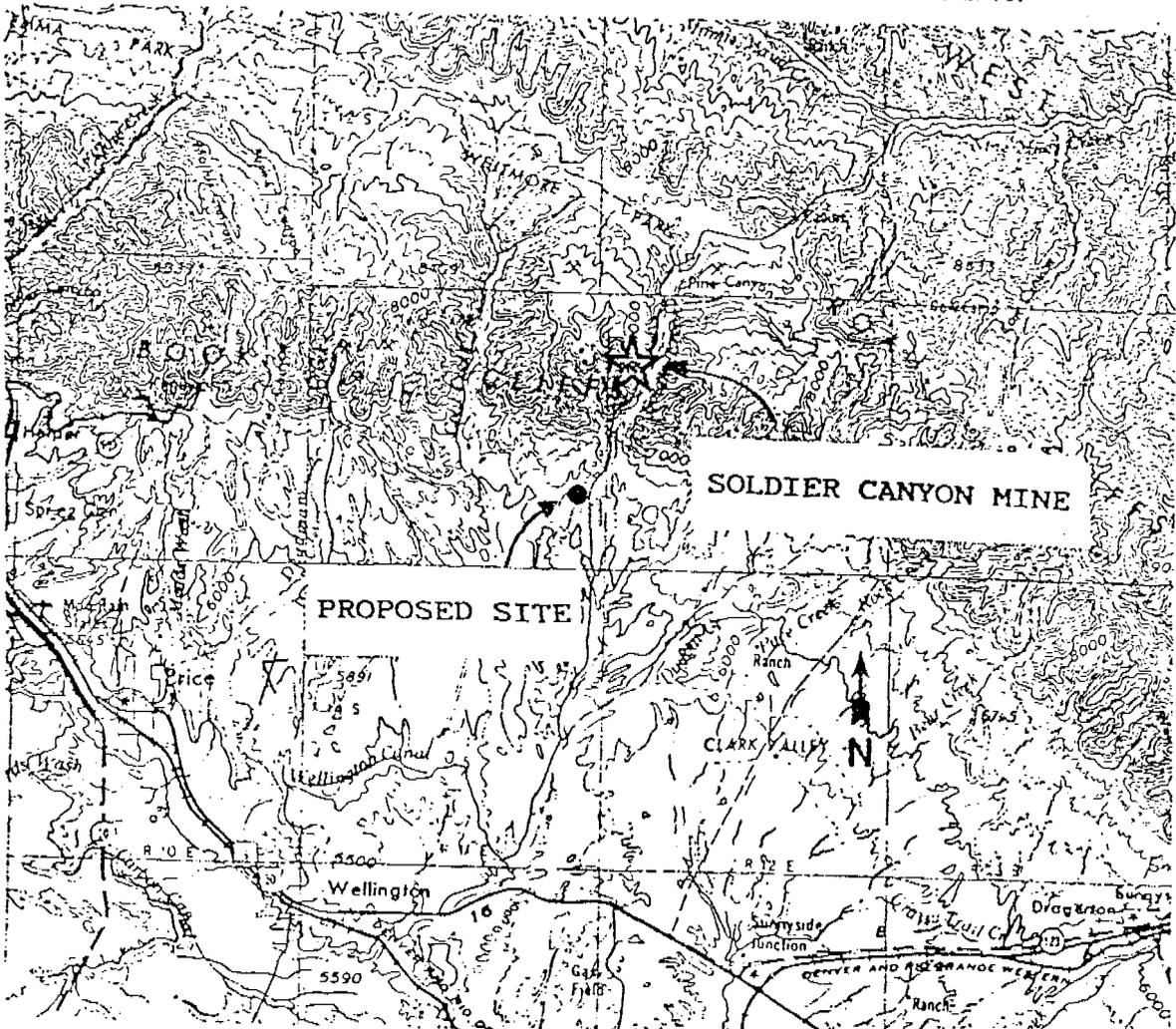
of March 19 91

orn to before me this

of March 19 91

Notary Public.

94



Notary Public  
HOLLY JO CROFTS  
260 North 600 West  
Price, Utah 84501  
My Commission Expires  
October 22, 1994  
State of Utah



# State of Utah

Division of State History

(Utah State Historical Society)

Department of Community and Economic Development

Norman H. Bangertter  
Governor  
Max J. Evans  
Director

300 Rio Grande  
Salt Lake City, Utah 84101-1182  
801-533-5755

FAX 801-364-6436

March 29, 1991

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DIVISION OF  
OIL GAS & MINING

Daron R. Haddock  
Permit Supervisor  
Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

RE: Topsoil Storage Site, Permit Revision Package, Soldier Creek Coal  
Company, Soldier Canyon Mine, ACT/007/018-90-1, Folder #2, Carbon County,  
Utah

In Reply Please Refer to Case No. M967

Dear Mr. Haddock:

The Utah State Historic Preservation Office received the above referenced mine plan report on March 12, 1991. The report states that one archaeological sites was recorded within the project impact area; [42CB 188]. We concur with your recommendation that the site is eligible for the National Register of Historic Places. We also understand that 42CB 188 will be avoided during construction. We, therefore, also concur with your recommendation that there will be No Effect as a result of this project.

This information is provided on request to assist the Division of Oil, Gas and Mining with its Section 106 responsibilities as specified in 36 CFR 800. If you have questions or need additional assistance, please contact me at (801) 533-7039.

Sincerely,

James L. Dykman  
Regulation Assistance Coordinator

JLD:M967 DOGM



# United States Department of the Interior

BUREAU OF LAND MANAGEMENT

3400  
(U-066)

Moab District  
Price River Resource Area  
900 North 700 East  
Price, Utah 84501

APR 04 1991

IN REPLY REFER TO:

Mr. Daron R. Haddock  
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

RE: Topsoil Storage Site, Permit Revision Package, Soldier Creek Coal  
Company, Soldier Canyon Mine, ACT/007/018-90-1, Folder #2, Carbon County,  
Utah

Dear Mr. Haddock:

We have reviewed the permit revision package for the subject case and offer the following comments. The project area is located within critical deer winter habitat. Bureau of Land Management planning guidelines for this area require that major construction operations occur outside the critical period for wintering mule deer (11-1 through 5-15). To the extent possible, we would like to see any major construction operations occur outside this winter period.

The sensitive plant species *Hedysarum occidentale* var. *canone* has been noted in this area. We would like to see a negative declaration in the vegetation section that the proposed project would not impact this plant.

If you have any questions, please feel free to contact Mark Mackiewicz of my staff at 637-4584.

Sincerely yours,

~~Acting~~ Area Manager

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DIVISION OF  
OIL GAS & MINING