

PERMIT CHANGE TRACKING FORM

DATE RECEIVED	PERMIT NUMBER <i>ACT/007/018</i>
Title of Proposal: <i>Midterm Revision</i>	PERMIT CHANGE # <i>94B</i>
Description:	PERMITTEE <i>Soldier Creek Coal Co.</i>
	MINE NAME <i>Soldier Creek</i>

	DATE DUE	DATE DONE	RESULT	
	<input type="checkbox"/> 15 DAY INITIAL RESPONSE TO PERMIT CHANGE APPLICATION	<i>2/2</i>		<input type="checkbox"/> ACCEPTED	☐ REJECTED
<input type="checkbox"/> Notice of Review Status of proposed permit change sent to the Permittee.	<i>Rec'd 2/12/95</i>	<i>3/12/95</i>	Permit Change Classification	
<input type="checkbox"/> Request additional review copies prior to Division/Other Agency review.			<input type="checkbox"/> Significant Permit Revision	
<input type="checkbox"/> Notice of Approval of Publication. (If change is a Significant Revision.)			<input type="checkbox"/> Permit Amendment	
<input type="checkbox"/> Notice of request to modify proposed permit change prior to approval.			<input type="checkbox"/> Incidental Boundary Change	

REVIEW TRACKING	INITIAL REVIEW		MODIFIED REVIEW		FINAL REVIEW AND FINDINGS	
DOGM REVIEWER	DUE	DONE	DUE	DONE	DUE	DONE
<input type="checkbox"/> Administrative						
<input type="checkbox"/> Biology <i>Paul</i>		<i>12/6/94</i>	<i>3/31/95</i>			
<input type="checkbox"/> Engineering <i>Wayne</i>						
<input type="checkbox"/> Geology						
<input type="checkbox"/> Soils						
<input type="checkbox"/> Hydrology <i>Sharon</i>		<i>12/6/94</i>	<i>3/31/95</i>			
<input type="checkbox"/> Bonding <i>Wayne</i>		<i>12/6/94</i>	<i>3/31/95</i>			
<input type="checkbox"/> AVS Check						

COORDINATED REVIEWS	DUE	DONE	DUE	DONE	DUE	DONE
<input type="checkbox"/> OSMRE						
<input type="checkbox"/> US Forest Service						
<input type="checkbox"/> Bureau of Land Management						
<input type="checkbox"/> US Fish and Wildlife Service						
<input type="checkbox"/> US National Parks Service						
<input type="checkbox"/> UT Environmental Quality						
<input type="checkbox"/> UT Water Resources						
<input type="checkbox"/> UT Water Rights						
<input type="checkbox"/> UT Wildlife Resources						
<input type="checkbox"/> UT State History						
<input type="checkbox"/> Other						

<input type="checkbox"/> Public Notice/Comment/Hearing Complete (If the permit change is a Significant Revision)	<input type="checkbox"/> Permit Change Approval Form signed and approved effective as of this date. <input type="checkbox"/> Permit Change Denied.
<input type="checkbox"/> Copies of permit change marked and ready for MRP.	<input type="checkbox"/> Notice of <input type="checkbox"/> Approval <input type="checkbox"/> Denial to Permittee.
<input type="checkbox"/> Special Conditions/Stipulations written for approval.	<input type="checkbox"/> Copy of Approved Permit Change to File.
<input type="checkbox"/> TA and CHIA modified as required.	<input type="checkbox"/> Copy of Approved Permit Change to Permittee.
<input type="checkbox"/> Permit Change Approval Form ready for approval.	<input type="checkbox"/> Copies to Other Agencies and Price Field Office.

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	DATE DUE	DATE DONE	RESULT
<input type="checkbox"/> 15 DAY INITIAL RESPONSE TO PERMIT CHANGE APPLICATION			<input type="checkbox"/> ACCEPTED <input type="checkbox"/> REJECTED
<input type="checkbox"/> Notice of Review Status of proposed permit change sent to the Permittee.			Permit Change Classification
<input type="checkbox"/> Request additional review copies prior to Division/Other Agency review.			<input type="checkbox"/> Significant Permit Revision
<input type="checkbox"/> Notice of Approval of Publication. (If change is a Significant Revision.)			<input type="checkbox"/> Permit Amendment
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<input type="checkbox"/> Engineering <i>Wayne</i>						
<input type="checkbox"/> Geology _____						
<input type="checkbox"/> Soils _____						
<input type="checkbox"/> Hydrology <i>Sharon</i>		<i>12/6/94</i>	<i>3/31/95</i>	<i>3/31/95</i>		
<input type="checkbox"/> Bonding <i>Wayne</i>		<i>12/6/94</i>	<i>3/31/95</i>			
<input type="checkbox"/> AVS Check _____						

COORDINATED REVIEWS	DUE	DONE	DUE	DONE	DUE	DONE
<input type="checkbox"/> OSMRE						
<input type="checkbox"/> US Forest Service						
<input type="checkbox"/> Bureau of Land Management						
<input type="checkbox"/> US Fish and Wildlife Service						
<input type="checkbox"/> US National Parks Service						
<input type="checkbox"/> UT Environmental Quality						
<input type="checkbox"/> UT Water Resources						
<input type="checkbox"/> UT Water Rights						
<input type="checkbox"/> UT Wildlife Resources						
<input type="checkbox"/> UT State History						
<input type="checkbox"/> Other						

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Coastal
The Energy People

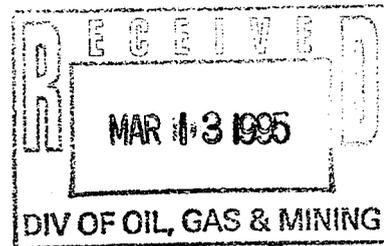
REID W. "RICK" OLSEN
VICE PRESIDENT AND GENERAL MANAGER
SOLDIER CREEK COAL COMPANY

March 7, 1995

95
94B

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

Re: Mid-Term Review
Soldier Creek Coal Company



Dear Mr. Haddock,

Copy Done: PAM

The following is our response to the requirements of the mid-term review for the Soldier Canyon Mine ACT/007/018. #2

1. **Requirements:** No adjustment to the reclamation bond is needed at this time, however, the Operator must be required to submit information on the demolition cost associated with demolition of foundations, footers and floor besides disposal fees.

Response: We have enclosed two bonding calculations both which include the cost associated with demolition of foundations, footers and floor. Our calculations show total costs for reclamation with all existing facilities and the other with all existing plus all planned facilities.

2. The No. 3 fan site must be reclaimed according to the current plan or in order to postpone reclamation at the No. 3 fan site, Soldier Creek must amend the plan. The site requires better stabilization through supplemental interim revegetation.

Response: We have revised pages 7 - 161, 7 - 162 and 7-164 to indicate that the No. 3 fansite is to be retained. Although this site has received interim reclamation the site is still a viable option for mine development in the future. We have added a statement that additional interim seeding will be done on a "as needed" basis. We have removed the quarterly water monitoring

requirements on P. 7-164 for ASCA's as this is not required by the R645 regulations.

3. *The following were determined incomplete responses to D.O. 92-A:*

A permanent waste rock site, currently approved according to the R645 requirements, should be provided by the Operator until approval of the proposed waste rock site is granted.

Response: The Soldier Canyon Mine currently is not producing underground waste rock beyond that which is being disposed of in underground workings. Soldier Creek Coal Company is planning on doing exploration work in Dugout Canyon at the old Ideal Minesite. We are currently anticipating the permitting and development of the Dugout Canyon Mine after our exploration is finished. As part of this permitting process, we will be permitting and developing a waste rock site which will be used by both the Dugout and Soldier Canyon Mines.

During the interim period, if soldier Canyon Mine does produce some incidental waste rock that needs surface disposal we will amend their permit and the Skyline Mines permit to allowing disposal of waste rock at the approved Skyline Mines Scofield site.

4. *Table 7.24-2 Page 7 - 8 does not reflect Sunoco as owner of water right title 91-203. The Operator has since changed owners and the proper water right owner should now be identified. The Operator did not meet the requirements of D.O. 92-A #3, as required by R645-300-143. The Operator has not met the requirements of R645-301-724-100. (See January 8, 1992 letter from the Division of Water Rights).*

Response: We have changed Page 7 - 8 to reflect current owner of water rights of Title 91-203 as Sagepoint Coal Company which is a subsidiary of Coastal States Energy Co.

This Table 7.24-2 will be added to and brought up to date when the Soldier Canyon Mine permit is amended later this spring to include the Alkali coal lease.

5. *The Operator did not meet the requirements of D.O. 92-A #4, as required by R645-300-143. The Operator has not met the requirements of R645-301-724.100. Soldier Creek Coal Company must provide a commitment in the Mining and Reclamation Plan to coordinate with the Division of Water Rights immediately upon the determination that a water source has been impacted by mining operations. (See January 8, 1992 letter from the Division of Water*

Rights).

Response: Page 7-105 has to be changed to include the necessary commitment.

6. *The following are inadequate response to the requirements of Condition 6.*
 - a. *The Operator must include a map survey showing the potential recharge areas in the permit. Fracture zones identified in the mining process should be identified and referenced as potential recharge zones as required by R645-301-724-600, Survey of Renewable Resource Lands.*
 - b. *The LOM area when used should be used consistently throughout the plan; see pages 7-25 and 7-34. Provide consistent representative information for the estimated groundwater storage and recharge in LOM area and hydrogeologic basins.*
 - c. *The monitoring "assessment", to take place throughout the year during the mining process, was not described as to the degree of the assessment; i.e., what parameters will be monitored/described this proposal does not meet the requirements of R645-301-731.210 and R645-301-730.*
 - d. *The following potential hydrologic impacts are not assessed through the existing in-mine monitoring plan and therefore the Operator does not meet the requirements of R645-301-731.211.*
 - i. *The interception of perched aquifers which issue as a spring would not be monitored through the proposed in-mine monitoring schedule. The proposed annual inventory potentially misses "unusual" in-flows if an area is closed prior to completing the inventory. A qualitative analysis to identify the source characteristic of the intercepted aquifer would be unavailable.*
 - ii. *The Operator has not described how the proposed annual sampling plan is adequate to determine seasonal variations inflow thus potential impacts on the hydrologic balance, including variations due to recharge functions.*
 - iii. *The Operator has not demonstrated that flows of 50 GPM will adequately monitor for all potential impacts as required under R645-301-731.210. The Operator has not described how the proposal will meet the quality and quantity and frequency*

sampling requirements. The Operator should commit to a minimum time period in which to notify the Division and other agencies of these high magnitude inflows.

Response: See response to Item No. 7.

7. *The Operator does not have a series of wells to describe the aquifer below the lowest seam to be mined. However, Spring 6 emanates from the Aberdeen tongue below the coal seams in Dugout Canyon and may describe this system. The Operator should discuss the area of recharge to this Spring 6 using site specific information as required by R645-301-731 and R645-301-731.211. Hydrogeologic structures from drill logs, and/or relative location and flow direction may support the conclusion that this spring will not be impacted.*

Response: The deficiencies listed in Item No.'s 6 and 7 are extremely complex and involved. The more we looked at these issues the more we became convinced that we currently do not have adequate data available to properly respond. We therefore have issued a contract to Dr. Alan Mayo of Mayo and Associates, consultants in hydrogeology to develop an updated PHC for the Soldier Canyon Mine including the Alkali tract. He started work on February 23, 1995. As soon as he has finalized his work we will be able to adequately respond to these Division concerns.

As part of Dr. Mayo's contract he will present his preliminary findings to the Division before he writes the final PHC. We feel this process will assure that all of the Division's concerns are answered.

8. *The Operator should either properly redevelop the Well 6-1 or follow the requirements for well closure as required by R645-301-731.215. Redevelopment is required for the Operator to maintain this well as is proposed in the current mine plan. This well could provide important information through bond release to determine flooding of the mine workings.*

Response: Final disposition of Well 6-1 will be determined as part of the contract with Dr. Mayo.

9. *The Operator has provided Figure 7.31-9 for Well 6-1. The scale used to present the information is inadequate. The Operator should present a scale in feet rather than thousands of feet to provide a clear figure per R645-301-121.*

Response: We have enclosed a revised Figure 7.31-9.

10. *The figure heading in Figure 7.24.7, incorrectly describes the information presented. The Operator provides the depth to water from the well casings not the water level elevation as indicated. Because the elevations have no relative base elevation the presentation of data is unclear. The Operator has not met the requirements of R645-301-121.*

Response: We have enclosed a revised Figure 7.24.7

11. *The Operator's present plan indicates drill hole 6-1 is expected to remain as a viable water monitoring point beyond the originally proposed 1993 longwall extraction. The Operator committed to reassessing well monitoring sites in conjunction with the re-evaluation of the long-term mine plan. The Operator is not conducting the operations according to the approved permit R645-300.142. Therefore, reassessment should be completed at this time.*

Response: Final disposition of Well 6-1 will be determined as part of the contract with Dr. Mayo.

12. *Information in the plan is not current and concise information as required by R645-301-121. According to discussion with the Operator, proposed waste rock site, longwall mining, and processing plant operations identified in the current plan will not be pursued within the upcoming permit term. The Operator should update the plan to identify the proposed dates of the Fan Portal Area, the waste rock site and the preparation plant construction per R645-301-526.113. The Operator should update the proposed mine sequence and timing due to the change in the proposed longwall mining operations.*

Response: Coastal States Energy Company bought the Soldier Creek Coal Company and the associated private properties in late 1993. During 1994, extensive reorganization of the Soldier Creek Coal Company took place along with in-depth studies of various mining scenarios and marketing strategies. Some things are starting to gel as to where and how the Soldier Creek Coal company fits in best with the overall strategic of the Coastal States Energy Company. Due to these many variable and complex factors the Soldier Creek Coal Company is not yet in a position to make any major changes in the approved MRP. The approved plans for a waste rock site, longwall mining and processing plant operations are still viable potential operations. Hopefully, by the time the Soldier Canyon Mine MRP is renewed, we will be in a position to make the necessary changes to bring the plan into line with current management goals.

If you have further questions or need additional information please let us know.

Sincerely,



For R.W. "Rick" Olsen
Vice President/General Manager
Soldier Creek Coal Company

KZ:RWO:dk

SC30222.KZ

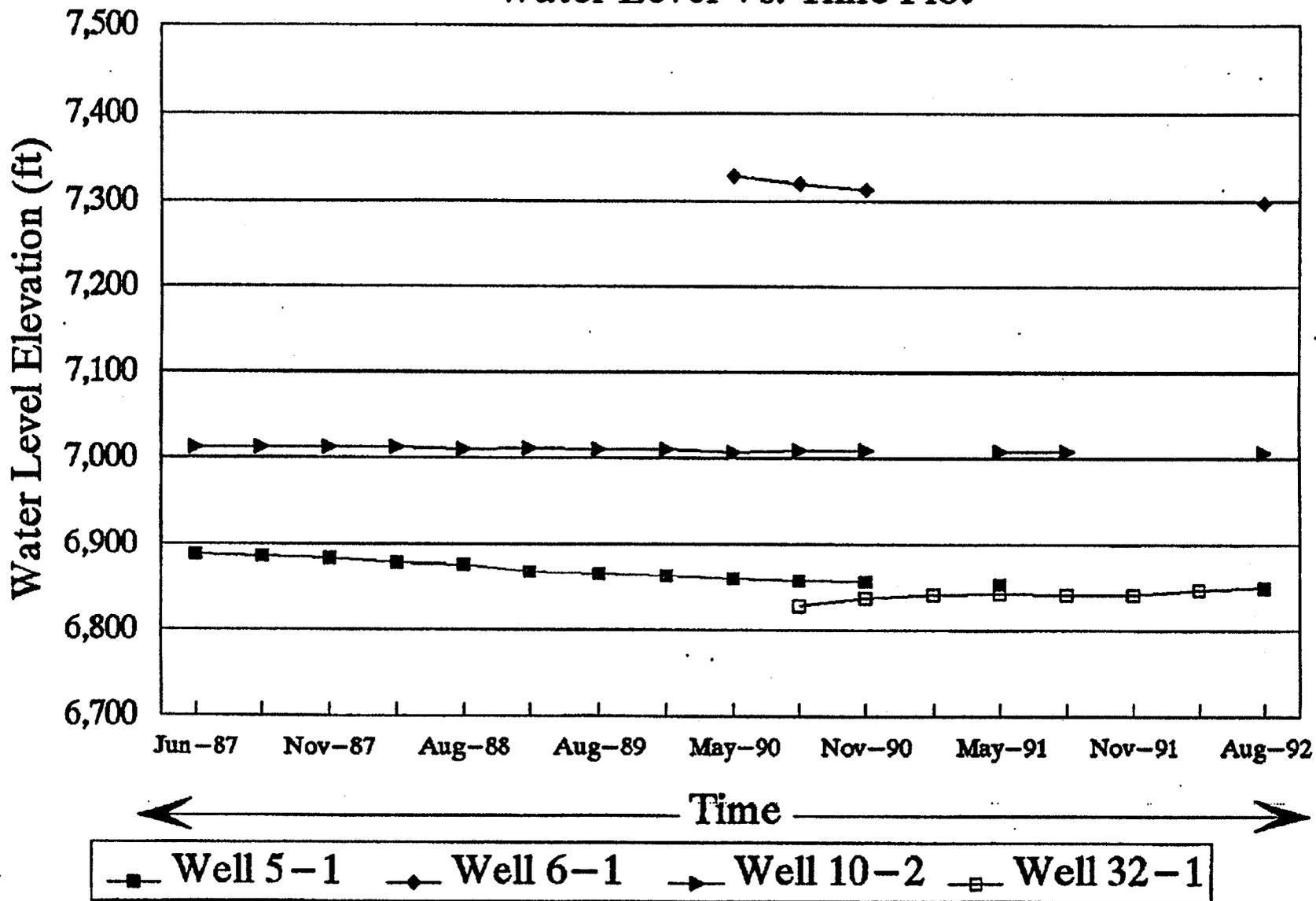
TABLE 7.24-2 (Continued)
WATER RIGHTS OWNERSHIP

Water Right	Location (Section)	Owner	Use	Quantity of Use (acre-ft)	Period of Use	Source of Water
Township 13 South Range 12 East (continued)						
501	10	Sunoco Energy	Stockwater	--	--	ST
502	10	Sunoco Energy	Stockwater	--	--	ST
547	10	Sunoco Energy	Stockwater	0.25	1/01 - 12/31	ST
4806	10	Sunoco Energy	Stockwater	11.48	1/01 - 12/31	ST
501	10	Sunoco Energy	Stockwater	--	--	ST
505	10	Sunoco Energy	Stockwater	0.25	1/01 - 12/31	SP
504	10	Sunoco Energy	Stockwater	0.25	1/01 - 12/31	ST
499	10	Sunoco Energy	Stockwater	0.25	1/01 - 12/31	ST
503	10	Sunoco Energy	Stockwater	--	--	SP
506	15	Sunoco Energy	Stockwater	0.25	1/01 - 12/31	ST
508	15	Sunoco Energy	Stockwater	--	--	SP
507	15	Sunoco Energy	Stockwater	0.25	1/01 - 12/31	SP
509	15	Sunoco Energy	Stockwater	0.1	1/01 - 12/31	ST
529	16	Sunoco Energy	Irrigation	0.25	1/01 - 12/31	SP
528	16	Sunoco Energy	Stockwater	0.25	1/01 - 12/31	SP
527	16	Sunoco Energy	Stockwater	0.25	1/01 - 12/31	SP
533	17	Sunoco Energy	Stockwater	0.25	1/01 - 12/31	SP
552	18	Sam Sampinos	Stockwater	--	--	ST
203	18	Sage Point Coal	Industrial	0.25	1/01 - 12/31	GW
377	18	Bernard Iriart	Stockwater	--	--	ST
2574	18	U.S.B.L.M.	Stockwater	10.64	1/01 - 12/31	ST
519	19	Sunoco Energy	Irrigation	0.15	4/01 - 12/31	ST
36	19	Sunoco Energy	Irrigation	229.0	1/01 - 12/31	ST
497	19	Sunoco Energy	Irrigation	65.64	1/01 - 12/31	ST
725	19	Sunoco Energy	Irrigation	189.46	1/01 - 12/31	ST

ST = Stream, SP = Spring, GW = Groundwater

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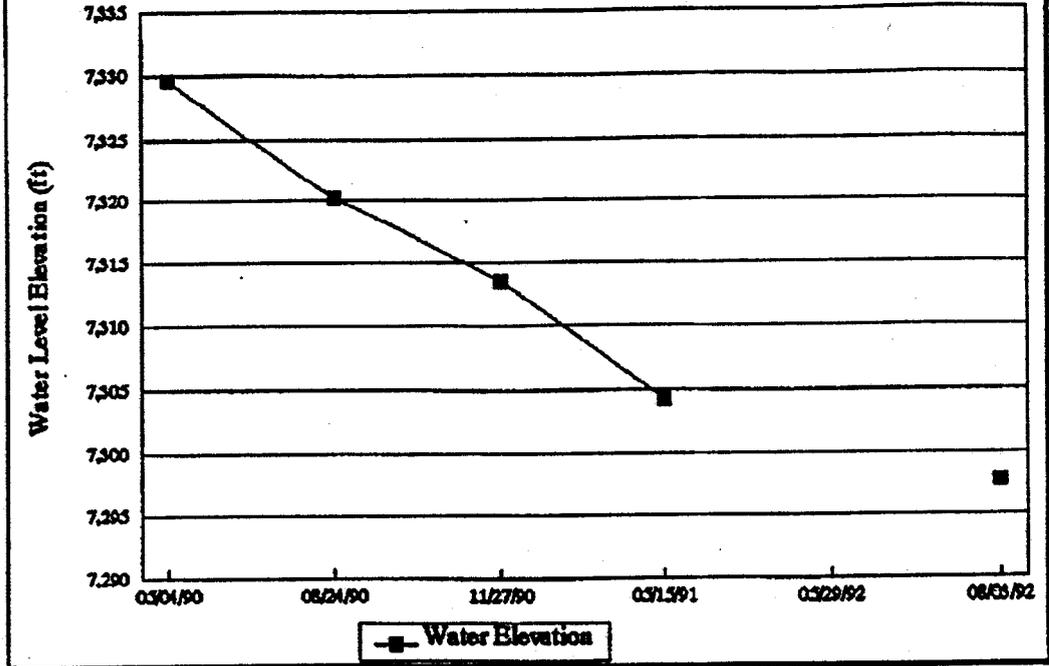
FIGURE 7.24-7
Water Level Vs. Time Plot



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FIGURE 7.31-9
SAMPLE SITE WELL 6-1



Date	Depth to Water (ft)	Water Elevation (ft)
05/04/90	395.0	7,329.7
08/24/90	404.5	7,320.2
11/27/90	411.2	7,313.5
05/15/91	420.4	7,304.3
05/29/92		
08/03/92	426.9	7,297.8

*OK
more data avail*

is in excess of 15 ft, the culvert has a capacity well beyond the design volume. Therefore, the potential for this by-pass culvert to contribute to sediment loading, during a storm greater than design, appears to be minimal.

If a larger than design event were to occur, the impact on downstream resources and land use would be minimal. This is due in large part to the lack of downstream development and the wide section of the Soldier Creek drainage. Except for one agricultural area approximately 4 miles downstream of the mine, there is little no development between the mine and about one mile upstream of the confluence with the Price River. Also, there are no utilities within this drainage except for the power lines to the mine.

Following reclamation, stream channels will be returned to a stable state (see Section 7.61). The reclamation channel for Soldier Creek has been designed to safely pass the peak flow resulting from the 100-year, 6-hour storm, while the side drainages conveying runoff through the reclaimed site have been designed to safely pass the peak flow from 10-year, 6-hour storm. Thus, flooding in the reclaimed areas will be precluded. Additionally, interim sediment-control measures and maintenance of the reclaimed areas during the post-mining period will preclude deposition of significant amounts of sediment in downstream channels following reclamation. Thus, maintaining the hydraulic capacity of the channel and precluding adverse flooding impacts.

7.29 Cumulative Hydrologic Impact Assessment (CHIA)

The Division has already prepared a CHIA for the Soldier Canyon Mine permit area. Additional data is presented within this application to assist the Division in preparing a CHIA, for the refuse disposal site and adjacent areas.

7.30 Operation Plan

7.31 General Requirements

This section describes the groundwater and surface water protection plan and water quality monitoring program implemented within the existing permit area and to be implemented for the refuse disposal site. The purpose of the groundwater and surface water protection plan is to minimize the potential for water pollution and changes in water quality and flow for surface and groundwater within and adjacent to disturbed areas. The purpose of the water quality monitoring program is to identify the potential impacts of coal mining operations on the hydrologic balance. Should mining operations have an impact on a water established water right, this information will be coordinated with the Utah Division of Water Rights.

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A permit amendment, authorizing the exploration activities, was approved by DOGM on October 16, 1992 (ACT/007/018-91E). The purpose of the exploration work was to evaluate the suitability of the site for a proposed fan/shaft facility. Applied Geotechnical Engineering Consultants, Inc. (AGEC) were contracted to perform a complete geotechnical investigation. Their work included drilling four exploratory borings to bedrock, laboratory testing of selected soil samples and performing a seismic refraction survey. Based on the field exploration and laboratory testing, AGECE was able to conclude that the site was favorable for the proposed facilities. Their final report has detailed the subsurface conditions of the site and made recommendations for the design and construction of said facilities.

SCCC notified DOGM of its intent to proceed with the construction of the #3 fan facility in a letter dated December 3, 1991. However, following that notification letter, unforeseen circumstances have indefinitely delayed this project. Subsequently, SCCC has opted to proceed with an interim revegetation and stabilization plan for the site. This interim reclamation shall be initiated and completed during the fall of 1992. The proposed reclamation work shall be implemented in accordance with Section 3.31 ~~ex~~ and in accordance with the modified revegetation plan as described below. ~~(The actual plan implemented shall be dependent on the capabilities of available contractors.)~~

The modified revegetation plan is as follows:

1. A trackhoe shall "pock mark" the entire road surface and road out-slope where practicable. This "pock marking" is intended to facilitate the retention of any precipitation on site, thus, enhancing sediment control and revegetation success.
2. An appropriate fertilizer (16-16-8) shall be hand broadcast and raked into the seedbed. (Alternatively, the fertilizer may be hand broadcast prior to the "pock marking" operations. This would allow for the fertilizer to be more efficiently incorporated into the soil.)
3. The seed shall be either hand broadcast or hydroseeded over the site, followed by a light hand raking to cover the seed. If hydroseeding is selected, the seed shall be applied with only a tackifier or no additives at all.
4. All seeded areas will be oversprayed with a wood fiber mulch at a rate of 2,000 lbs/acre. A tackifier will also be applied at a rate of 60 lbs/acre.
5. Additional interim seeding will be done on a "as needed" basis until adequate vegetative cover is established.

In addition to the revegetation treatments and "pock marking" described above, other sediment control measures include the following (See Exhibit 7.42-1 and 7.42-2).

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1. The road has been constructed sloping towards the toe of the in-slope. This provides a flow path for runoff which is treated with a series of straw bales and/or silt fences.
2. A small earthen berm has been placed along the outer edge of the road to prevent any road drainage from contributing to the drainage of the steeper out-slope areas. This berm is approximately 6-12 inches in height. Also, as shown on Exhibit 7.42-1, both the road and road out-slope drain away from the berm. Placement of the berm was an additional precautionary measure only and no specific design for the berm was performed.
3. A small sediment basin was constructed at the base of the road as a final treatment structure for road runoff.
4. Straw bales and/or silt fences have been placed at strategic locations in and around the disturbed area.

Watershed characteristics were evaluated utilizing the SCS curve number methodology and the computer program Sedimot II. Open channel flows were also evaluated using a computer program, FlowMaster I (Copyright 1991 Haestad Methods, Inc.). The summarized results are on Table 7.42-1.

Generally, the maximum allowable flow velocity for an unlined ditch is 5 feet per second. Therefore, since the design velocity for the road drainage ditch is substantially less than 5 feet per second, no riprap lining is required.

As final treatment for the exploration road runoff, a small sediment basin was constructed. This basin is located at the base of the exploration road, adjacent to the county road. Its size is approximately 30'L x 15'W x 2'D. Also the design inflow to the basin has been calculated to be 1.86 cfs for a 10yr-24hr storm event. Sediment basin design methodology, as detailed by Edward A. Hansen, (Hydrologist, North Central Forest Experiment Station, Region 9), indicates that this basin will remove nearly 100% of the sediment particles measuring 0.125 mm or larger. The outlet of this basin is also controlled and treated with a notched silt fence.

The completed exploration activities have concluded that the site is favorable for the proposed 3rd fan facility. ~~However, Sun Coal Company's unexpected announcement to sale the Soldier Canyon Mine has indefinitely delayed the continuation of this project.~~ The described interim revegetation and stabilization plan is designed to provide effective sediment control for the site ~~until a new owner can assess the viability of this project. In any case, Soldier Creek Coal Company shall submit a complete permit amendment for the fan site or~~ Although this site will not be developed in the immediate future, access needs to be maintained to the site so that it can be fully developed when mine planning dictates it is needed.

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TABLE 7.42-1

No. 3 Fan Exploration Project
Watershed Design Summary
 (See Exhibit 7.42-2)

	<u>No. 3 Fan Watershed</u>		<u>Road & Road Up-Slope</u>
	<u>A</u>	<u>B</u>	
Area (acres)	4.91	6.01	0.42
Average Basin Slope (%)	67.5	78.4	44.1
Curve Number	75	75	78
Hydraulic Length (ft)	810	1,500	675
Time of Concentration (hrs)	0.063	0.096	0.042
Design Storm	10yr-6hr	10yr-6hr	10yr-6hr
Precipitation depth (Ins)	1.52	1.52	1.52
Storm type	SCS Type "B"	SCS Type "B"	SCS Type "B"
Peak Flow (cfs)	0.57	0.70	0.08
Runoff (Ins)	0.17	0.17	0.24
Runoff Volume (acre-ft)	0.0712	0.0841	0.0085
Design storm	10yr-24hr	10yr-24hr	10yr-24hr
Precipitation Depth (ins)	1.85	1.85	1.85
Storm Type	Type II	Type II	Type II
Peak Flow (cfs)	1.67	2.04	0.19
Runoff (ins)	0.31	0.31	0.40
Runoff Volume (acre-ft)	0.0712	0.0841	0.0085

No. 3 Fan Exploration Project
Road Drainage Ditch Design Summary

Channel	-	Triangular
Left Side Slope	-	1 h : 1 v
Right Side Slope	-	20 h : 1 v
Channel Slope	-	10.5 %
Flow 10yr-6hr	-	0.65 cfs
Manning's n	-	0.030
Flow Velocity	-	1.35 ft/sec
Flow Depth	-	0.21 ft
Flow Width	-	4.50 ft
Flow Area	-	0.48 ft ²

~~proceed with final reclamation of the fan site by the fall of 1994. The final reclamation activities shall be implemented in accordance with the approved MRP (Section 3.41.22-24). These reclamation activities will include the proper closure of the soil test hole B-1 in accordance with the State of Utah, Administrative Rules for Water Well Drillers.~~

Monitoring

~~ASCA's discharge will be monitored, if practical, for parameters applicable to State and Federal limitations, and data submitted to DOGM on a quarterly basis.~~

7.42.2.2 Sedimentation Pond

Located just North of R.E.I. storage area. The central facilities sedimentation pond was initially designed by Vaughn Hansen Associates, Salt Lake City, Utah; approved by the regulatory agencies; and constructed during October-November 1979. A portion of the sedimentation pond was subsequently reconstructed during August, 1986. During November 1990, EarthFax Engineering, Inc. was contracted to evaluate the runoff control and treatment facilities for the Central Mine Facilities Expansion. EarthFax's runoff control plan, as well as the sediment pond modifications and final construction report, are presented in Appendix 7-A. Sediment pond modifications according to Appendix 7-A, were completed on November 22, 1991 and are shown on the "as-built" Drawing B-127.

As indicated in Appendix 7-A, the facilities area will contribute 1.62 acre-feet of runoff to the sedimentation pond during the 10 year-24 hour storm. Based on the current configuration, the pond is slightly oversized and will handle an additional 0.27 acre-feet of water.

The total disturbed area contributing to the pond totals 14.7 acres. The sediment storage required to be provided in the pond for this area of disturbance is 1.47 acre-feet. This will result in the maximum sediment storage being at an elevation of 6649.6 feet. The sediment collected in the pond will be removed when 60 percent of the maximum storage volume (0.88 acre-feet) has been deposited. This cleanout level corresponds to an elevation of 6647.6 feet. With the decant elevation at 6649.6 feet, the clean out level will be at least 2.0 feet below the decant level, thus meeting previous requirements of the Utah Bureau of Water Pollution Control placed on operation of the pond.

When sediment reaches the cleanout level it will be analyzed for potential acid-forming, toxic-forming or alkalinity producing materials prior to removal. Tests will be conducted in accordance to "Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining." Division approval on the suitability of the material will be obtained prior to disposal.

R03/07/95

OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT
BOND AMOUNT COMPUTATION

Applicant Soldier Creek Coal Company

Permit Number ACT/007/018

Date 6 March 1995

Number of Acres 21.82

Type of Operation Underground Coal

Location Soldier Canyon; Carbon County, Utah

Prepared by Gary E. Taylor

Without Surface Expansion

Project SC³
Date 6 March 1995

WORKSHEET NO. 2
STRUCTURE DEMOLITION AND DISPOSAL COST SUMMARY

Listing of Buildings to be Demolished:

<u>Item</u>	<u>Type of Construc- tion Material</u>	<u>Volume (cubic feet)</u>	<u>Unit Cost Basis</u>	<u>Demolition Cost</u>
1)	See Attached Sheet			
2)				
3)				
4)				
5)				
				Total Cost = \$ <u> </u>

Other Items to be Demolished:

Debris Handling and Disposal Costs:

TOTAL DEMOLITION AND DISPOSAL COST = \$929,758

Data Sources: Means Construction Cost Data, 1995, Edition 53

TABLE 5.42-3

DESCRIPTION	MATERIAL	SIZE	UNIT	COST/UNIT	AMOUNT
OFFICE FOUNDATIONS DISPOSAL	Mixture Included in Warehouse	132,000	cu. ft.	\$0.23	30,360
WAREHOUSE FOUNDATIONS DISPOSAL	Mixture	15,950	cu. ft.	\$0.23	3,669 31,384 709
OLD SHOP FOUNDATIONS DISPOSAL	Mixture	192,000	cu. ft.	\$0.23	44,160 55,878 1,404
NEW SHOP FOUNDATIONS DISPOSAL	Mixture	45,936	cu. ft.	\$0.23	10,565 69,599 1,186
TRAINING RM. FOUNDATIONS DISPOSAL	Mixture Included in New Shop	17,748	cu. ft.	\$0.23	4,082
AMB. GARAGE FOUNDATIONS DISPOSAL	Mixture Included in New Shop	11,600	cu. ft.	\$0.23	2,668
BATH HOUSE FOUNDATIONS DISPOSAL	Mixture	96,000	cu. ft.	\$0.23	22,080 10,651 369
STORAGE SHED FOUNDATIONS DISPOSAL	Mixture	32,400	cu. ft.	\$0.23	7,452 23,495 525
SECURITY SHACK	Mixture	512	cu. ft.	\$0.23	118
STACKING TUBE FOUNDATIONS DISPOSAL	Steel	2,500	cu. ft.	\$0.21	525 5,077 236
CONTROL BLDG.	Mixture	1,430	cu. ft.	\$0.23	329
8,000 GAL. TANK	Steel Concrete	1,070 50	cu. ft. cu. ft.	\$0.21 \$212.00	225 10,600
4,000 GAL. TANK	Steel Concrete	535 34	cu. ft. cu. ft.	\$0.21 \$212.00	112 7,208
1,000 GAL. TANK	Steel Concrete	134 0	cu. ft. cu. ft.	\$0.21 \$212.00	28 0
1,500 GAL. TANK	Steel Concrete	201 3	cu. ft. cu. ft.	\$0.21 \$212.00	42 636
60,000 GAL. TANK	Steel Concrete	8,022 0	cu. ft. cu. ft.	\$0.21 \$212.00	1,685 0
LOADOUT BIN FOUNDATIONS DISPOSAL	Mixture	15,000	cu. ft.	\$0.23	3,450 17,032 683
SEPTIC TANK	Steel	9,000	cu. ft.	\$0.21	1,890
FAN NO. 1	Mixture	15,400	cu. ft.	\$0.23	3,542
FAN NO. 2	Mixture	15,300	cu. ft.	\$0.23	3,519
CRIB WALL	Concrete	120	cu. yd.	\$212.00	25,440

SEWAGE PIPE	4" Steel	10,600	cu. ft.	\$6.35	67,310
SUBSTATION 1	Concrete	18	cu. yd.	\$212.00	3,816
SUBSTATION 2	Concrete	30	cu. yd.	\$212.00	6,360
BELT CONVEYOR	Mixture	57,000	cu. ft.	\$0.23	13,110
PORTALS (3)	Concrete	228	cu. yd.	\$212.00	48,336
PORTALS (5)	Concrete	370	cu. yd.	\$212.00	78,440
CULVERT ENDS	Concrete	2,000	cu. ft.	\$0.29	580
CULVERT	Steel	53,580	cu. ft.	\$0.21	11,252
DITCH	Concrete	1,170	cu. ft.	\$0.29	339
SMALL CULVERTS	Steel	4,700	cu. ft.	\$0.21	987
ROM CONVEYOR	Mixture	19,000	cu. ft.	\$0.23	4,370
SPEC. COAL CONV.	Mixture	4,500	cu. ft.	\$0.23	1,035
PARKING LOT	Asphalt	1,865	sq. yd.	\$6.60	12,309
OFFICE PARK	Asphalt	716	sq. yd.	\$6.60	4,726
OLD YARD ROAD	Asphalt	2,881	sq. yd.	\$6.60	19,015
NEW YARD ROAD	Asphalt	2,055	sq. yd.	\$6.60	13,563
RELOCATED ROAD AND NEW PORTAL ROAD	Asphalt	4,453	sq. yd.	\$6.60	29,390
FENCING	Chain Link	2,000	ft.	\$2.29	4,580
POWERLINE	Wire	2,500	ft.	\$4.81	12,025
ON-SITE DISPOSAL		30,563	cu. yd.	\$6.40	195,603
Subtotal Demolition Cost					\$929,758

Project SC³
 Date 6 March 1995

WORKSHEET NO. 5

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

Rough Grade

Characterization of Dozer Used (type, size, etc.):

D9N Dozer with "U" Blade - 650 cy/hr

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.):

300 LP + 5% effective grade, material is fill and well blasted.

Productivity Calculations:

$$\text{Operating Adjustment Factor} = \frac{.75}{\text{operator factor}} \times \frac{.80}{\text{material factor}} \times \frac{.83}{\text{work hour factor}} \times \frac{.70}{\text{grade factor}} \times \frac{.94}{\text{weight correction factor}} \times \frac{1.0}{\text{production method/blade factor}} \times \frac{.80}{\text{visibility}} \times \frac{.80}{\text{elevation}} \times \frac{.80}{\text{direct drive transmission}} = \frac{.17}{}$$

$$\text{Net Hourly Production} = \frac{650}{\text{normal hourly production}} \text{ yd}^3/\text{hr} \times \frac{.17}{\text{operating adjustment factor}} = \frac{109.05}{\text{yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{90,820}{\text{volume to be moved}} \text{ yd}^3 \div \frac{109.05}{\text{net hourly production}} \text{ yd}^3/\text{hr} = \frac{832.82}{\text{hrs}}$$

Assume three dozers are required for 277.61 Hrs.

Data Sources: Caterpillar Performance Handbook; Edition 21

Project SC³
 Date 6 March 1995

WORKSHEET NO. 6

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE--GRADING

Earthmoving Activity:

Spread Topsoil

Characterization of Dozer Used (type, size, etc.):

Caterpillar - D4C

Description of Dozer Use (push distance, % grade, blade effective length, operating speed, etc.):

300 L.F. + 5% Effective grade

Productivity Calculations:

$$\begin{aligned} \text{Operating Adjustment Factor} &= \frac{.75}{\text{operator factor}} \times \frac{1.20}{\text{material factor}} \times \frac{.83}{\text{work hour factor}} \times \frac{.9}{\text{grade factor}} \times \frac{.94}{\text{weight correction factor}} \times \frac{1.0}{\text{production method/blade factor}} \\ &\quad \times \frac{.80}{\text{visibility}} \times \frac{.80}{\text{elevation}} \times \frac{.80}{\text{direct drive transmission}} = \underline{.32} \end{aligned}$$

$$\text{Hourly Production} = \frac{2.2 \text{ mi/hr}}{\text{speed}} \times \frac{15.42 \text{ ft}}{\text{eff. blade width}} \times 5280 \text{ ft/mi} \times 1 \text{ ac}/43,560 \text{ ft}^2 = \underline{4.11} \text{ ac/hr}$$

$$\text{Net Hourly Production} = \frac{4.11 \text{ ac/hr}}{\text{hourly prod.}} \times \frac{.32}{\text{op. adj. factor}} = \underline{1.33} \text{ ac/hr}$$

$$\text{Hours Required} = \frac{21.82 \text{ ac}}{\text{ac/hr}} \div \frac{1.33 \text{ ac/hr}}{\text{ac/hr}} = \underline{16.41} \text{ hrs}$$

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project SC³
Date 6 March 1995

WORKSHEET NO. 8

PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

Loading Topsoil and Riprap

Characterization of Loader Used (type, size, etc.):

Caterpillar 966 E

Description of Loader Use (origin, destination, grade, haul distance, etc.):

50 LF + 2% Effective Grade

Productivity Calculations:

$$\text{Cycle time} = \frac{.08}{\text{haul time (loaded)}} + \frac{.06}{\text{return time (empty)}} + \frac{.55}{\text{basic cycle time}} = \frac{.69}{\text{min}}$$

$$\text{Net Bucket Capacity} = \frac{5.0}{\text{heaped bucket capacity}} \text{ yd}^3 \times \frac{.95}{\text{bucket fill factor}} = \frac{4.75}{\text{yd}^3}$$

$$\text{Net Hourly Production} = \frac{4.75}{\text{net bucket capacity}} \text{ yd}^3 \div \frac{.69}{\text{cycle time}} \text{ min} \times \frac{50}{\text{work hour factor}} \text{ min/hr} = \frac{344.20}{\text{yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{12,241}{\text{volume to be moved}} \text{ yd}^3 \div \frac{344.20}{\text{net hourly production}} \text{ yd}^3/\text{hr} = \frac{35.56}{\text{hrs}}$$

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project SC³
 Date 6 March 1995

WORKSHEET NO. 8

PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

Backfill Portals

Characterization of Loader Used (type, size, etc.):

915 Eimco LHD

Description of Loader Use (origin, destination, grade, haul distance, etc.):

50 LF, 0 Grade

Productivity Calculations:

$$\text{Cycle time} = \frac{1.56}{\text{haul time (loaded)}} + \frac{1.56}{\text{return time (empty)}} + \frac{.44}{\text{basic cycle time}} = \underline{3.56} \text{ min}$$

$$\text{Net Bucket Capacity} = \frac{7}{\text{heaped bucket capacity}} \text{ yd}^3 \times \frac{.8}{\text{bucket fill factor}} = \underline{5.60} \text{ yd}^3$$

$$\text{Net Hourly Production} = \frac{5.60}{\text{net bucket capacity}} \text{ yd}^3 \div \frac{3.56 \text{ min} \times 50 \text{ min/hr}}{\text{cycle time} \quad \text{work hour factor}} = \underline{78.65} \text{ yd}^3/\text{hr}$$

$$\text{Hours Required} = \frac{2,215}{\text{volume to be moved}} \text{ yd}^3 \div \frac{78.65 \text{ yd}^3/\text{hr}}{\text{net hourly production}} = \underline{28.15} \text{ hrs}$$

Data Sources:

Eimco Jarvis Clark Data Sheets

Project SC³
 Date 6 March 1995

WORKSHEET NO. 9

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

Topsoil and Riprap Hauling

Characterization of Truck Used (type, size, etc.):

12 Yd. Dump Truck

Description of Truck Use (origin, destination, grade, haul distance, truck capacity, etc.):

4 Mile haul one way

Productivity Calculations:

$$\text{Cycle time} = \frac{6.86}{\text{haul time}} + \frac{6.00}{\text{return time}} + \frac{2.53}{\text{total loading time}} + \frac{2.2}{\text{dump and maneuver time}} = 17.59 \text{ min}$$

$$\text{Number of Trucks Required} = \frac{17.59}{\text{truck cycle time}} \div \frac{2.53}{\text{total loading time}} = 6$$

$$\text{Production Rate} = \frac{12 \text{ yd}^3}{\text{truck capacity}} \times \frac{6}{\# \text{ of trucks}} \div \frac{17.59}{\text{cycle time}} \text{ min} = 4.09 \text{ yd}^3/\text{min}$$

$$\text{Hourly Production} = \frac{4.09}{\text{production rate}} \text{ yd}^3/\text{min} \times \frac{50 \text{ min/hr}}{\text{work hour factor}} = 204.66 \text{ yd}^3/\text{hr}$$

$$\text{Hours Required} = \frac{18,474}{\text{volume to be moved}} \text{ yd}^3 \div \frac{204.66}{\text{hourly production}} \text{ yd}^3/\text{hr} = 90.27 \text{ hrs}$$

$$21,120 \text{ ft.} / 3,520 \text{ FPM} = 6.00 \text{ Minutes}$$

$$21,120 \text{ ft.} / 3,080 \text{ FPM} = 6.86 \text{ Minutes}$$

Data Sources:

Project SC³
 Date 6 March 1995

WORKSHEET NO. 9A

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

Haul Sub-Base

Characterization of Truck Used (type, size, etc.):

20 Ton Bottom Dumps

Description of Truck Use (origin, destination, grade, haul distance, truck capacity, etc.):

Haul Distance - 25 Miles one way

Productivity Calculations:

$$\text{Cycle time} = \frac{33.33}{\text{haul time}} + \frac{30.00}{\text{return time}} + \frac{8}{\text{total loading time}} + \frac{.5}{\text{dump and maneuver time}} = 71.83 \text{ min}$$

$$\text{Number of Trucks Required} = \frac{71.83}{\text{truck cycle time}} \div \frac{8}{\text{total loading time}} = 9$$

$$\text{Production Rate} = \frac{15.59}{\text{truck capacity}} \text{ yd}^3 \times \frac{9}{\# \text{ of trucks}} \div \frac{71.83}{\text{cycle time}} \text{ min} = 1.95 \text{ yd}^3/\text{min}$$

$$\text{Hourly Production} = \frac{1.95}{\text{production rate}} \text{ yd}^3/\text{min} \times \frac{50 \text{ min/hr}}{\text{work hour factor}} = 97.67 \text{ yd}^3/\text{hr}$$

$$\text{Hours Required} = \frac{396}{\text{volume to be moved}} \text{ yd}^3 \div \frac{97.67}{\text{hourly production}} \text{ yd}^3/\text{hr} = 4.05 \text{ hrs}$$

$$\text{Haul } 132,000 \text{ ft.} / 3,960 \text{ ft/mn} = 33.33$$

$$\text{Return } 132,000 \text{ ft.} / 4,400 \text{ ft/mn} = 30.00$$

Data Sources:

Project SC³
Date 6 March 1995

WORKSHEET NO. 10

PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Excavate Culvert

Characterization of the Excavator Used (type, size, etc.):

Caterpillar 215 D LC Excavator

Description of Excavator Used (loading geometry, materials, etc.):

Productivity Calculations:

$$\text{Net bucket capacity} = \frac{1.36 \text{ yd}^3}{\text{heaped bucket capacity}} \times \frac{.70}{\text{fill factor}} = \underline{.95 \text{ yd}^3}$$

$$\text{Net Hourly Production} = \frac{.95 \text{ yd}^3}{\text{net bucket capacity}} \times \frac{55 \text{ min/hr}}{\text{work hour factor}} \div \frac{.33 \text{ min}}{\text{cycle time}} = \underline{158.33 \text{ yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{42.827 \text{ yd}^3}{\text{volume to be handled}} \div \frac{158.33 \text{ yd}^3/\text{hr}}{\text{net hourly production}} = \underline{270.49 \text{ hrs}}$$

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project SC³
Date 6 March 1995

WORKSHEET NO. 10 A

PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Excavate Cut Areas

Characterization of the Excavator Used (type, size, etc.):

Caterpillar 215 D LC Excavator

Description of Excavator Used (loading geometry, materials, etc.):

Productivity Calculations:

$$\text{Net bucket capacity} = \frac{1.36}{\text{heaped bucket capacity}} \text{ yd}^3 \times \frac{.70}{\text{fill factor}} = \underline{.95 \text{ yd}^3}$$

$$\text{Net Hourly Production} = \frac{.95 \text{ yd}^3}{\text{net bucket capacity}} \times \frac{55 \text{ min/hr}}{\text{work hour factor}} \div \frac{.33 \text{ min}}{\text{cycle time}} = \underline{158.33 \text{ yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{25,683 \text{ yd}^3}{\text{volume to be handled}} \div \frac{158.33 \text{ yd}^3/\text{hr}}{\text{net hourly production}} = \underline{162.21 \text{ hrs}}$$

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project SC³
Date 6 March 1995

WORKSHEET NO. 10 B

PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Place Riprap and Filter Blanket

Characterization of the Excavator Used (type, size, etc.):

Caterpillar 215 D LC Excavator

Description of Excavator Used (loading geometry, materials, etc.):

Pick up material and place

Productivity Calculations:

$$\text{Net bucket capacity} = \frac{1.36 \text{ yd}^3}{\text{heaped bucket capacity}} \times \frac{.70}{\text{fill factor}} = \underline{.95 \text{ yd}^3}$$

$$\text{Net Hourly Production} = \frac{.95 \text{ yd}^3}{\text{net bucket capacity}} \times \frac{45 \text{ min/hr}}{\text{work hour factor}} \div \frac{.33 \text{ min}}{\text{cycle time}} = \underline{129.55 \text{ yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{9,910 \text{ yd}^3}{\text{volume to be handled}} \div \frac{129.55 \text{ yd}^3/\text{hr}}{\text{net hourly production}} = \underline{76.50 \text{ hrs}}$$

Data Sources:

Caterpillar Performance Handbook, Edition 21

WORKSHEET NO. 12

PRODUCTIVITY AND HOURS REQUIRED FOR MOTORGRADER USE--GRADING

Earthmoving Activity:

Grade Sub-Base

Characterization of Grader Used (type, size capacity, etc.):

Caterpillar 14 G

Description of Grader Route (push distance, % grade, blade effective length, operating speed, etc.):

Effective Blade Width - 8 ft.

Speed - 2.4 MPH

Productivity Calculations:

Contour Grading:

$$\text{Hourly Production} = \frac{2.4 \text{ mi/hr}}{\text{speed}} \times \frac{8 \text{ ft}}{\text{eff. blade width}} \times 5280 \text{ ft/mi} \times 1 \text{ ac}/43,560 \text{ ft}^2 \times$$

$$\frac{.3}{\text{work hour factor}} = \underline{0.70} \text{ ac/hr}$$

Scarification:

$$\text{Hourly Production} = \frac{\text{mi/hr}}{\text{work speed}} \times \frac{\text{ft}}{\text{scarifier width}} \times 5280 \text{ ft/mi} \times 1 \text{ ac}/43,560 \text{ ft}^2 \times$$

$$\frac{\text{work hour factor}}{\text{work hour factor}} = \underline{\quad} \text{ ac/hr}$$

$$\text{Hours Required} = \frac{1.49 \text{ ac}}{\underline{0.70} \text{ ac/hr}} = \underline{2.13} \text{ hrs}$$

Data Sources:

Catepillar Performance Handbook, Edition 21

Project SC³
 Date 6 March 1995

WORKSHEET NO. 13
 SUMMARY CALCULATION OF EARTHMOVING COSTS

<u>Equipment Type</u>	<u>Owning and Operating Cost (\$/hr) Equipment + Accessories</u>	<u>Labor Cost (\$/hr)</u>	<u>Total Hrs Req'd</u>	<u>Total Cost (\$)</u>
D9N Dozer (3)((	118.00)	+ 32.50	1 x 277.61	= 125,341
D4C Dozer ((	70.00)	+ 32.50	1 x 16.41	= 1,682
966 E Loader ((	46.00)	+ 32.50	1 x 35.56	= 2,791
915 LHD ((	40.00)	+ 32.50	1 x 28.15	= 2,041
12 Yd. Truck ((6)	32.50)	+ 22.15	1 x 90.27	= 4,933
20 Ton Truck ((9)	52.00)	+ 22.40	1 x 4.05	= 301
215 D Excavator ((	40.00)	+ 32.50	1 x 509.20	= 36,917
14G Motorgrader	47.00)	+ 32.50	1 x 2.13	= 169
((	)	+ 1 x		=
((	)	+ 1 x		=
((	)	+ 1 x		=
((	)	+ 1 x		=
Total Cost =				<u>174,175</u>

Equipment and Accessory Identification:

Data Sources: W.W. Clyde, Equipment and Labor Rental Sheet

Project SC³
 Date 6 March 1995

WORKSHEET NO. 14
 REVEGETATION COSTS

Name and Description of Area to be Revegetated:

Description of Revegetation Activities:

Reseeding:

$$\frac{21.82}{\text{(\# of acres to be reseeded)}} \text{ acres} \times \left(\frac{\$}{\text{(\$/acre for seedbed preparation)}} \text{ per acre} + \frac{\$ 1,692}{\text{(\$/acre for seeding, fertilizing, and mulching)}} \text{ per acre} \right) = \frac{\$ 36,919}{\text{(costs for reseeded)}}$$

Planting Trees and Shrubs:

$$\frac{21.82}{\text{(\# of acres for planting)}} \text{ acres} \times \frac{\$ 300}{\text{(\$/acre for planting trees and shrubs)}} \text{ per acre} = \frac{\$ 6,546}{\text{(costs for planting)}}$$

Other Revegetation Activity for this Area (e.g., Soil Sampling):

(Describe and provide cost estimate with documentation; use additional sheets if necessary.)

$$15 \text{ Trees/AC} \times \$20/\text{Tree} = \$300/\text{AC}$$

$$\text{TOTAL REVEGETATION COST FOR THIS AREA} = \underline{\$ 43,465}$$

Data Sources:

Means Building Construction Cost Data, Edition 53

Project SC³
 Date March 6, 1995

WORKSHEET NO. 15
 OTHER RECLAMATION ACTIVITY COSTS

Descriptions of Reclamation Activity:

Seal Portals
 Seal Shaft - 6" Slab on Grade
 Silt Fence Installation - 63,700 ft.
 Remove Pavement - 4"
 Remove Signs/Delineators - 6 Signs, 44 Posts

Assumptions:

Seal Portal - Cost per Block = \$.91 3 Men to complete work in 3 days, 8 Hours/Day
 Seal Shaft - Pump Truck = \$17.10/Cu.Yd., Concrete \$75.00/Cu.Yd. = \$92.10
 Silt Fence Installed - \$.34/ft., 2 Laborers @ \$17.80/Ea. 800 ft./ Hr. Installation
 Remove pavement - \$6.60/sq. yd.
 Remove signs/delineators - \$15.65/sign, \$8.95/Delineators

Cost Estimate Calculations:

Remove Signs/Delineators - $\$15.65 \times 6 + \$8.95 \times 44 = \$488$
 Seal Portals - $2,510 \text{ sq./ft.} \times \$9.08/50 \text{ ft.} = \$22,800$
 Seal Shafts - $3.8 \text{ cu.yd.} \times \$92.10/\text{cu.yd.} = 350$
 Silt Fence Installation - $63,700 \text{ ft.} \times \$0.34/\text{ft.} + \frac{63,700}{800 \text{ pr.hr.}} \times \$17.80 \times 2 = \$24,493$
 Remove Pavement - $1,560 \text{ sq. yd.} \times \$6.60 = \$10,296$ TOTAL = \$ _____

Other Documentation or Notes:

(Include additional sheets, maps, calculations, etc., as necessary to document estimate.)

Data Sources:

Means Construction Cost Data 1995, Edition 53

Project SC³
Date 6 March 1995

WORKSHEET NO. 15
OTHER RECLAMATION ACTIVITY COSTS

Descriptions of Reclamation Activity:

Asphalt Reconstructed County Road

Assumptions:

10,692 Cu. Ft. x 145 lb./cu.ft. = 1,550,340 lbs. ÷ 2000 lb/ton = 775.17 Ton

Cost Estimate Calculations:

775.17 Tons x \$34.50/Ton = \$26,743

TOTAL = \$ 85,170

Other Documentation or Notes:
(Include additional sheets, maps, calculations, etc., as necessary to document estimate.)

Data Sources:

Means Building Construction Cost Data, Edition 53

Project SC³
 Date 6 March 1995

WORKSHEET NO. 16
 RECLAMATION BOND SUMMARY SHEET

1.	Total Facility and Structure Removal Costs	\$	<u>929,758</u>
2.	Total Earthmoving Costs		<u>174,175</u>
3.	Total Revegetation Costs		<u>43,465</u>
4.	Total Other Reclamation Activities Costs		<u>85,170</u>
5.	Subtotal: Total Direct Costs		<u>1,232,568</u>
6.	Mobilization and Demobilization (at <u>3</u> % of Item 5) (1% to 5% of Item 5)		<u>36,977</u>
7.	Contingencies (at <u>7</u> % of Item 5) (see Table 4)		<u>86,280</u>
8.	Engineering Redesign Fee (at <u>6</u> % of Item 5) (see Graph 1)		<u>73,954</u>
9.	Contractor Profit and Overhead (at <u>8.8</u> % of Item 5) (see Graph 2)		<u>108,466</u>
10.	Reclamation Management Fee (at <u>4.4</u> % of Item 5) (see Graph 3)		<u>54,233</u>
11.	TOTAL BOND AMOUNT (Sum of Items 5 through 10)	\$	<u>1,592,478</u>
12.	Escalation @ 2.01%/Yr.* for 2 Years		64,018
13.	Grand Total Bond Amount (Sum of Item 5 through 10 and 12)	\$	1,656,496

* - Means Historical Cost Index

OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT
BOND AMOUNT COMPUTATION

Applicant Soldier Creek Coal Company

Permit Number ACT/007/018

Date 6 March 1995

Number of Acres 28.92

Type of Operation Underground Coal

Location Soldier Canyon, Carbon County, Utah

Prepared by Gary E. Taylor

Project SC³ - A

Date 6 March 1995

WORKSHEET NO. 2

STRUCTURE DEMOLITION AND DISPOSAL COST SUMMARY

Listing of Buildings to be Demolished:

<u>Item</u>	<u>Type of Construction Material</u>	<u>Volume (cubic feet)</u>	<u>Unit Cost Basis</u>	<u>Demolition Cost</u>
1)	<u>See Attached Sheets</u>			
2)				
3)				
4)				
5)				

Total Cost = \$

Other Items to be Demolished:

Debris Handling and Disposal Costs:

TOTAL DEMOLITION AND DISPOSAL COST = \$ 1,204,613

Data Sources:

TABLE 5.42-3

DESCRIPTION	MATERIAL	SIZE	UNIT	COST/UNIT	AMOUNT
OFFICE FOUNDATIONS DISPOSAL	Mixture Included in Warehouse	132,000	cu. ft.	\$0.23	30,360
WAREHOUSE FOUNDATIONS DISPOSAL	Mixture	15,950	cu. ft.	\$0.23	3,669 31,384 709
OLD SHOP FOUNDATIONS DISPOSAL	Mixture	192,000	cu. ft.	\$0.23	44,160 55,878 1,404
NEW SHOP FOUNDATIONS DISPOSAL	Mixture	45,936	cu. ft.	\$0.23	10,565 69,599 1,186
TRAINING RM. FOUNDATIONS DISPOSAL	Mixture Included in New Shop	17,748	cu. ft.	\$0.23	4,082
AMB. GARAGE FOUNDATIONS DISPOSAL	Mixture Included in New Shop	11,600	cu. ft.	\$0.23	2,668
BATH HOUSE FOUNDATIONS DISPOSAL	Mixture	96,000	cu. ft.	\$0.23	22,080 10,651 369
STORAGE SHED FOUNDATIONS DISPOSAL	Mixture	32,400	cu. ft.	\$0.23	7,452 23,495 525
SECURITY SHACK	Mixture	512	cu. ft.	\$0.23	118
STACKING TUBE FOUNDATIONS DISPOSAL	Steel	2,500	cu. ft.	\$0.21	525 5,077 236
CONTROL BLDG.	Mixture	1,430	cu. ft.	\$0.23	329
8,000 GAL. TANK	Steel Concrete	1,070 50	cu. ft. cu. ft.	\$0.21 \$212.00	225 10,600
4,000 GAL. TANK	Steel Concrete	535 34	cu. ft. cu. ft.	\$0.21 \$212.00	112 7,208
1,000 GAL. TANK	Steel Concrete	134 0	cu. ft. cu. ft.	\$0.21 \$212.00	28 0
1,500 GAL. TANK	Steel Concrete	201 3	cu. ft. cu. ft.	\$0.21 \$212.00	42 636
60,000 GAL. TANK	Steel Concrete	8,022 0	cu. ft. cu. ft.	\$0.21 \$212.00	1,685 0
LOADOUT BIN (2) FOUNDATIONS DISPOSAL	Mixture	30,000	cu. ft.	\$0.23	6,900 17,032 683
SEPTIC TANK	Steel	9,000	cu. ft.	\$0.21	1,890
FAN NO. 1	Mixture	15,400	cu. ft.	\$0.23	3,542
FAN NO. 2	Mixture	15,300	cu. ft.	\$0.23	3,519

CRIB WALL	Concrete	120	cu. yd.	\$212.00	25,440
SEWAGE PIPE	4" Steel	10,600	cu. ft.	\$6.35	67,310
SUBSTATION 1	Concrete	18	cu. yd.	\$212.00	3,816
SUBSTATION 2	Concrete	30	cu. yd.	\$212.00	6,360
BELT CONVEYOR	Mixture	57,000	cu. ft.	\$0.23	13,110
PORTALS (3)	Concrete	228	cu. yd.	\$212.00	48,336
PORTALS (5)	Concrete	370	cu. yd.	\$212.00	78,440
REFUSE BIN	Mixture	6,667	cu. ft.	\$0.23	1,533
PREP. PLANT	Mixture	187,500	cu. ft.	\$0.23	43,125
THICKENER	Mixture	9,620	cu. ft.	\$0.23	2,213
SILOS (2)	Concrete	300,000	cu. ft.	\$0.29	87,000
TRANSFER BLDG.	Mixture	12,500	cu. ft.	\$0.23	2,875
CULVERT ENDS	Concrete	2,000	cu. ft.	\$0.29	580
CULVERT	Steel	53,580	cu. ft.	\$0.21	11,252
DITCH	Concrete	1,170	cu. ft.	\$0.29	339
SMALL CULVERTS	Steel	4,700	cu. ft.	\$0.21	987
ROM CONVEYOR	Mixture	19,000	cu. ft.	\$0.23	4,370
REACCLAIM CONV.	Mixture	11,250	cu. ft.	\$0.23	2,588
SPEC. COAL CONV.	Mixture	4,500	cu. ft.	\$0.23	1,035
REFUSE CONV.	Mixture	810	cu. ft.	\$0.23	186
PARKING LOT	Asphalt	1,865	sq. yd.	\$6.60	12,309
OFFICE PARK	Asphalt	716	sq. yd.	\$6.60	4,726
OLD YARD ROAD	Asphalt	2,881	sq. yd.	\$6.60	19,015
NEW YARD ROAD	Asphalt	2,055	sq. yd.	\$6.60	13,563
RELOCATED ROAD AND NEW PORTAL ROAD	Asphalt	4,453	sq. yd.	\$6.60	29,390
FENCING	Chain Link	3,350	ft.	\$2.29	7,672
POWERLINE	Wire	2,500	ft.	\$4.81	12,025
ON-SITE DISPOSAL		50,687	cu. yd.	\$6.40	324,397
Subtotal Demolition Cost					\$1,204,613

Project SC³ - A
 Date 6 March 1995

WORKSHEET NO. 5

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE

Earthmoving Activity:

Rough Grade

Characterization of Dozer Used (type, size, etc.):

D9N Dozer with "U" Blade - 650 Cy/Hr

Description of Dozer Use (origin, destination, grade, haul distance, material, etc.):

300 LF + 5% Effective Grade, Material is fill and well blasted

Productivity Calculations:

$$\begin{aligned} \text{Operating Adjustment Factor} &= \frac{.75}{\text{operator factor}} \times \frac{.80}{\text{material factor}} \times \frac{.83}{\text{work hour factor}} \times \frac{.70}{\text{grade factor}} \times \frac{.94}{\text{weight correction factor}} \times \frac{1.0}{\text{production method/blade factor}} \times \\ &\quad \frac{.80}{\text{visibility}} \times \frac{.80}{\text{elevation}} \times \frac{.80}{\text{direct drive transmission}} = \underline{.17} \end{aligned}$$

$$\text{Net Hourly Production} = \frac{650 \text{ yd}^3/\text{hr}}{\text{normal hourly production}} \times \frac{.17}{\text{operating adjustment factor}} = \underline{109.05 \text{ yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{125,810 \text{ yd}^3}{\text{volume to be moved}} \div \frac{109.05 \text{ yd}^3/\text{hr}}{\text{net hourly production}} = \underline{1,153.69 \text{ hrs}}$$

Assume three dozers are required for 384.56 ea.

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project SC³ - A
 Date 6 March 1995

WORKSHEET NO. 6

PRODUCTIVITY AND HOURS REQUIRED FOR DOZER USE--GRADING

Earthmoving Activity:

Spread Topsoil

Characterization of Dozer Used (type, size, etc.):

Caterpillar D4C

Description of Dozer Use (push distance, % grade, blade effective length, operating speed, etc.):

300 LF + 5% Effective Grade

Productivity Calculations:

$$\begin{aligned} \text{Operating Adjustment Factor} &= \frac{.75}{\text{operator factor}} \times \frac{1.20}{\text{material factor}} \times \frac{.83}{\text{work hour factor}} \times \frac{.9}{\text{grade factor}} \times \frac{.94}{\text{weight correction factor}} \times \frac{1.0}{\text{production method/blade factor}} \\ &\quad \times \frac{.80}{\text{visibility}} \times \frac{.80}{\text{elevation}} \times \frac{.80}{\text{direct drive transmission}} = \underline{.32} \end{aligned}$$

$$\text{Hourly Production} = \frac{2.2 \text{ mi/hr}}{\text{speed}} \times \frac{15.42 \text{ ft}}{\text{eff. blade width}} \times 5280 \text{ ft/mi} \times 1 \text{ ac}/43,560 \text{ ft}^2 = \underline{4.11} \text{ ac/hr}$$

$$\text{Net Hourly Production} = \frac{4.11 \text{ ac/hr}}{\text{hourly prod.}} \times \frac{.32}{\text{op. adj. factor}} = \underline{1.33} \text{ ac/hr}$$

$$\text{Hours Required} = \frac{28.92 \text{ ac}}{\underline{1.33} \text{ ac/hr}} = \underline{21.74} \text{ hrs}$$

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project SC³ - A
Date 6 March 1995

WORKSHEET NO. 8

PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

Loading Topsoil, riprap and excess fill

Characterization of Loader Used (type, size, etc.):

Caterpillar 966 E

Description of Loader Use (origin, destination, grade, haul distance, etc.):

50 LF + 2% Effective Grade

Productivity Calculations:

$$\text{Cycle time} = \frac{.08}{\text{haul time (loaded)}} + \frac{.06}{\text{return time (empty)}} + \frac{.55}{\text{basic cycle time}} = \frac{.69}{\text{min}}$$

$$\text{Net Bucket Capacity} = \frac{5.0}{\text{heaped bucket capacity}} \text{ yd}^3 \times \frac{.95}{\text{bucket fill factor}} = \frac{4.75}{\text{yd}^3}$$

$$\text{Net Hourly Production} = \frac{4.75}{\text{net bucket capacity}} \text{ yd}^3 \div \frac{.69}{\text{cycle time}} \text{ min} \times \frac{50 \text{ min/hr}}{\text{work hour factor}} = \frac{344.20}{\text{yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{32,843}{\text{volume to be moved}} \text{ yd}^3 \div \frac{344.20}{\text{net hourly production}} \text{ yd}^3/\text{hr} = \frac{95.42}{\text{hrs}}$$

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project SC³
Date 6 March 1995

WORKSHEET NO. 8 A

PRODUCTIVITY AND HOURS REQUIRED FOR LOADER USE

Earthmoving Activity:

Backfill Portals

Characterization of Loader Used (type, size, etc.):

915 Eimco LHD

Description of Loader Use (origin, destination, grade, haul distance, etc.):

50 LF, 0 Gear

Productivity Calculations:

$$\text{Cycle time} = \frac{1.56}{\text{haul time (loaded)}} + \frac{1.56}{\text{return time (empty)}} + \frac{.44}{\text{basic cycle time}} = \underline{3.56} \text{ min}$$

$$\text{Net Bucket Capacity} = \frac{7}{\text{heaped bucket capacity}} \text{ yd}^3 \times \frac{.8}{\text{bucket fill factor}} = \underline{5.60} \text{ yd}^3$$

$$\text{Net Hourly Production} = \frac{5.60}{\text{net bucket capacity}} \text{ yd}^3 \div \frac{3.56}{\text{cycle time}} \text{ min} \times \frac{50}{\text{work hour factor}} \text{ min/hr} = \underline{78.65} \text{ yd}^3/\text{hr}$$

$$\text{Hours Required} = \frac{2,215}{\text{volume to be moved}} \text{ yd}^3 \div \frac{78.65}{\text{net hourly production}} \text{ yd}^3/\text{hr} = \underline{28.15} \text{ hrs}$$

Data Sources:

Eimco Jarvis Clark Data Sheets

Project SC³

Date 6 March 1995

WORKSHEET NO. 9

PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

Topsoil, riprap and excess fill haulage

Characterization of Truck Used (type, size, etc.):

12 Yd. Dump Truck

Description of Truck Use (origin, destination, grade, haul distance, truck capacity, etc.):

4 Mile haul one way

Productivity Calculations:

$$\text{Cycle time} = \frac{6.86}{\text{haul time}} + \frac{6.00}{\text{return time}} + \frac{2.53}{\text{total loading time}} + \frac{2.2}{\text{dump and maneuver time}} = \underline{17.59 \text{ min}}$$

$$\text{Number of Trucks Required} = \frac{17.59}{\text{truck cycle time}} \div \frac{2.2}{\text{total loading time}} = \underline{6}$$

$$\text{Production Rate} = \frac{12}{\text{truck capacity}} \text{ yd}^3 \times \frac{6}{\# \text{ of trucks}} \div \frac{17.59}{\text{cycle time}} \text{ min} = \underline{4.09 \text{ yd}^3/\text{min}}$$

$$\text{Hourly Production} = \frac{4.09}{\text{production rate}} \text{ yd}^3/\text{min} \times \frac{50 \text{ min/hr}}{\text{work hour factor}} = \underline{204.66 \text{ yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{39,076}{\text{volume to be moved}} \text{ yd}^3 \div \frac{204.66}{\text{hourly production}} \text{ yd}^3/\text{hr} = \underline{190.27 \text{ hrs}}$$

$$21,120 \text{ ft.} / 3,080 \text{ ft./min.} = 6.86 \text{ Minutes}$$

$$21,120 \text{ ft.} / 3,520 \text{ ft./min.} = 6.00 \text{ Minutes}$$

Data Sources:

Project SC³
Date 6 March 1995

WORKSHEET NO. 9 A
PRODUCTIVITY AND HOURS REQUIRED FOR TRUCK USE

Earthmoving Activity:

Haul Sub-base

Characterization of Truck Used (type, size, etc.):

20 Ton bottom dumps

Description of Truck Use (origin, destination, grade, haul distance, truck capacity, etc.):

Haul distance - 25 miles one way

Productivity Calculations:

$$\text{Cycle time} = \frac{33.33}{\text{haul time}} + \frac{30.00}{\text{return time}} + \frac{8}{\text{total loading time}} + \frac{.5}{\text{dump and maneuver time}} = \underline{71.83 \text{ min}}$$

$$\text{Number of Trucks Required} = \frac{71.83}{\text{truck cycle time}} \div \frac{8}{\text{total loading time}} = \underline{9}$$

$$\text{Production Rate} = \frac{15.59 \text{ yd}^3}{\text{truck capacity}} \times \frac{9}{\# \text{ of trucks}} \div \frac{71.83}{\text{cycle time}} \text{ min} = \underline{1.95 \text{ yd}^3/\text{min}}$$

$$\text{Hourly Production} = \frac{1.95}{\text{production rate}} \text{ yd}^3/\text{min} \times \frac{50 \text{ min/hr}}{\text{work hour factor}} = \underline{97.67 \text{ yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{396}{\text{volume to be moved}} \text{ yd}^3 \div \frac{97.67}{\text{hourly production}} \text{ yd}^3/\text{hr} = \underline{4.05 \text{ hrs}}$$

Haul 132,000 ft./3,960 ft./min = 33.33 Minutes
Empty 132,000 ft./4,400 ft./min = 30.00 Minutes

Data Sources:

Project SC³
Date 6 March 1995

WORKSHEET NO. 10

PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Excavate Culverts

Characterization of the Excavator Used (type, size, etc.):

Caterpillar 215 D LC Excavator

Description of Excavator Used (loading geometry, materials, etc.):

Productivity Calculations:

$$\text{Net bucket capacity} = \frac{1.36 \text{ yd}^3}{\text{heaped bucket capacity}} \times \frac{.70}{\text{fill factor}} = \underline{.95 \text{ yd}^3}$$

$$\text{Net Hourly Production} = \frac{.95 \text{ yd}^3}{\text{net bucket capacity}} \times \frac{55 \text{ min/hr}}{\text{work hour factor}} \div \frac{.3 \text{ min}}{\text{cycle time}} = \underline{158.33 \text{ yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{85,654 \text{ yd}^3}{\text{volume to be handled}} \div \frac{158.33 \text{ yd}^3/\text{hr}}{\text{net hourly production}} = \underline{540.97 \text{ hrs}}$$

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project SC³
Date 6 March 1995

WORKSHEET NO. 10 A

PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Excavate Cut Areas

Characterization of the Excavator Used (type, size, etc.):

Caterpillar 215 D LC Excavator

Description of Excavator Used (loading geometry, materials, etc.):

Productivity Calculations:

$$\text{Net bucket capacity} = \frac{1.36}{\text{heaped bucket capacity}} \text{ yd}^3 \times \frac{.70}{\text{fill factor}} = \underline{.95 \text{ yd}^3}$$

$$\text{Net Hourly Production} = \frac{.95}{\text{net bucket capacity}} \text{ yd}^3 \times \frac{55}{\text{work hour factor}} \text{ min/hr} \div \frac{33}{\text{cycle time}} \text{ min} = \underline{158.33 \text{ yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{25,683}{\text{volume to be handled}} \text{ yd}^3 \div \frac{158.33}{\text{net hourly production}} \text{ yd}^3/\text{hr} = \underline{162.21 \text{ hrs}}$$

Data Sources:

Caterpillar Performance Handbook, Edition 21

Project SC³
Date March 6, 1995

WORKSHEET NO. 10 B

PRODUCTIVITY FOR HYDRAULIC EXCAVATOR USE (BACKHOE OR POWER SHOVEL)

Earthmoving Activities:

Place riprap and filter blanket

Characterization of the Excavator Used (type, size, etc.):

Caterpillar 215 D LC Excavator

Description of Excavator Used (loading geometry, materials, etc.):

Pickup material and place

Productivity Calculations:

$$\text{Net bucket capacity} = \frac{1.36}{\text{heaped bucket capacity}} \text{ yd}^3 \times \frac{.7}{\text{fill factor}} = \underline{.95 \text{ yd}^3}$$

$$\text{Net Hourly Production} = \frac{.95 \text{ yd}^3}{\text{net bucket capacity}} \times \frac{.45 \text{ min/hr}}{\text{work hour factor}} \div \frac{.33 \text{ min}}{\text{cycle time}} = \underline{129.55 \text{ yd}^3/\text{hr}}$$

$$\text{Hours Required} = \frac{9,910 \text{ yd}^3}{\text{volume to be handled}} \div \frac{129.55 \text{ yd}^3/\text{hr}}{\text{net hourly production}} = \underline{76.50 \text{ hrs}}$$

Data Sources:

Caterpillar Performance Handbook, Edition 1995

Project SC³ - A
 Date 6 March 1995

WORKSHEET NO. 12

PRODUCTIVITY AND HOURS REQUIRED FOR MOTORGRADER USE--GRADING

Earthmoving Activity:

Grade Sub-Base

Characterization of Grader Used (type, size capacity, etc.):

Caterpillar 14 G

Description of Grader Route (push distance, % grade, blade effective length, operating speed, etc.):

Effective blade width - 8 ft.
 Speed 2.4 MPH

Productivity Calculations:

Contour Grading:

$$\text{Hourly Production} = \frac{2.4 \text{ mi/hr}}{\text{speed}} \times \frac{8 \text{ ft}}{\text{eff. blade width}} \times 5280 \text{ ft/mi} \times 1 \text{ ac}/43,560 \text{ ft}^2 \times$$

$$\frac{.3}{\text{work hour factor}} = \underline{.70} \text{ ac/hr}$$

Scarification:

$$\text{Hourly Production} = \frac{\text{mi/hr}}{\text{work speed}} \times \frac{\text{ft}}{\text{scarifier width}} \times 5280 \text{ ft/mi} \times 1 \text{ ac}/43,560 \text{ ft}^2 \times$$

$$\frac{\text{work hour factor}}{\text{work hour factor}} = \underline{\quad} \text{ ac/hr}$$

$$\text{Hours Required} = \frac{1.49 \text{ ac}}{\underline{.70} \text{ ac/hr}} = \underline{2.13} \text{ hrs}$$

Data Sources:

Caterpillar Performance Handbook, Edition 1995

Project SC³ - A
 Date 6 March 1995

WORKSHEET NO. 13

SUMMARY CALCULATION OF EARTHMOVING COSTS

Equipment Type	Owning and Operating Cost (\$/hr) Equipment + Accessories	Labor Cost (\$/hr)	Total Hrs Req'd	Total Cost (\$)
D9N Dozer (3)	118.00	32.50	1,153.69	173,630
D4C Dozer ((	70.00	32.50	21.74	2,228
966 E Loader((	46.00	32.50	95.42	7,490
915 LHD ((	40.00	32.50	28.15	2,041
12 Yd. Truck((6)	32.50	22.15	190.17	10,393
20 Ton Truck((9)	52.00	22.40	4.05	301
215 D Excavator ((	40.00	32.50	779.68	56,527
14G Motorgrade ((	47.00	32.50	2.13	169
((=
((=
((=
((=
Total Cost =				<u>252,779</u>

Equipment and Accessory Identification:

Data Sources:

W.W. Clyde, Equipment & Labor Rental Sheets

Project SC³ - A
Date 6 March 1995

WORKSHEET NO. 15
OTHER RECLAMATION ACTIVITY COSTS

Descriptions of Reclamation Activity:

Seal Portals
Seal Shaft - 6" Slab on Grade
Silt Fenc Installation - 63,700 ft.
Remove Pavement - 4"
Remove Signs/Delineators - 6 signs, 164 posts

Assumptions:

Seal Portals - Cost of block = \$.91 3 Men to complete work in 3 days, 8 hr/day
Seal Shaft - Pump Truck - \$17.10/Cu.Yd., Concrete \$75.00/Cu.Yd. = \$92.10
Silt Fence Installation - \$.34/ft., 2 Laborers at \$17.80/hr., 800 ft./hr.
Remove Pavement - \$6.60/s.y.
Remove Delineators - \$15.65/Sign, \$8.95/Delineators

Cost Estimate Calculations:

Remove signs/delineators - $\$15.65 \times 6 + \$8.85 \times 164 = 1,562$
Seal Portals - $2,510 \text{ sq. ft.} \times \$9.08/\text{sq.ft.} = \$22,800$
Seal Shaft - $3.8 \text{ Cu.Yd.} \times \$92.10 = \$350$
Silt Fence Installation - $63,700 \text{ ft.} \times \$.34/\text{ft.} + \frac{63,700}{800} \times \$17.80 \times 2 = \$24,493$
Remove Pavement - $1,560 \text{ s.y.} \times \$6.60/\text{s.y.} = \$10,296$ TOTAL = \$ _____

Other Documentation or Notes:

(Include additional sheets, maps, calculations, etc., as necessary to document estimate.)

Data Sources:

Means Construction Cost Data 1995, Edition 53

Project SC³ - A
Date 6 March 1995

WORKSHEET NO. 15
OTHER RECLAMATION ACTIVITY COSTS

Descriptions of Reclamation Activity:

Asphalt reconstructed county road

Assumptions:

10,692 cu.ft. x 145 lb./cu.ft. = 1,550,340 lb ÷ 2,000 lb/ton = 775.17 Tons

Cost Estimate Calculations:

775.17 tons x \$34.50/ton = 26,743

TOTAL = \$ 86,245

Other Documentation or Notes:
(Include additional sheets, maps, calculations, etc., as necessary to document estimate.)

Data Sources:

Means Construction Cost Data 1995, Edition 53

Project SC³ - A

Date 6 March 1995

WORKSHEET NO. 16
RECLAMATION BOND SUMMARY SHEET

1.	Total Facility and Structure Removal Costs	\$ 1,204,613
2.	Total Earthmoving Costs	<u>252,779</u>
3.	Total Revegetation Costs	<u>57,609</u>
4.	Total Other Reclamation Activities Costs	<u>86,245</u>
5.	Subtotal: Total Direct Costs	<u>1,601,246</u>
6.	Mobilization and Demobilization (at <u>3</u> % of Item 5) (1% to 5% of Item 5)	<u>48,037</u>
7.	Contingencies (at <u>7</u> % of Item 5) (see Table 4)	<u>112,087</u>
8.	Engineering Redesign Fee (at <u>5.5</u> % of Item 5) (see Graph 1)	<u>88,069</u>
9.	Contractor Profit and Overhead (at <u>8.4</u> % of Item 5) (see Graph 2)	<u>134,505</u>
10.	Reclamation Management Fee (at <u>4.2</u> % of Item 5) (see Graph 3)	<u>67,252</u>
11.	TOTAL BOND AMOUNT (Sum of Items 5 through 10)	\$ <u>2,051,196</u>
12.	Escalation @ 2.01%/yr. for 2 years *	82,458
13.	Grand Total Bond Amount Sum of Item through 10 and 12	\$ 2,133,654

* - Means Historical Cost Index



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

Michael O. Leavitt
Governor

Ted Stewart
Executive Director

James W. Carter
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355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

April 3, 1995

Rick Olsen, Vice President
Soldier Creek Coal Company
P. O. Box 1029
Wellington, Utah 84542

Re: Midterm Response Review, Soldier Creek Coal Company, Soldier Canyon Mine, ACT/007/018-94B, Folder #3, Carbon County, Utah

Dear Mr. Olsen:

The Division has completed a review of the submittal dated March 7, 1995, intended to satisfy requirements of the Mid Term Review at the Soldier Canyon Mine. While some of the response is acceptable it is still not considered adequate to satisfy the requirement of the Mid Term Review. The enclosed review document discusses the remaining deficiencies which you are required to correct. Please examine the document making note of the requirement section. You must provide a response by no later than May 5, 1995.

Please call if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Daron R. Haddock".

Daron R. Haddock
Permit Supervisor

cc: P. Grubaugh-Littig
S. Falvey
W. Western
P. Baker

midrecov.sc3





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

Michael O. Leavitt
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355 West North Temple
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801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

March 31, 1995

TO: Daron Haddock, Permit Supervisor

FROM: Sharon Falvey, Senior Reclamation Hydrologist *SXF*

RE: Soldier Canyon Mid-term Review Response, Submitted March 13, 1995, Soldier Creek Coal Company, Soldier Canyon Mine, ACT/007/018 94B, File #2, Carbon County, Utah

SYNOPSIS

The Midterm Permit Review (December 6, 1994) determined whether previously approved changes were appropriately incorporated into the plan and, whether all existing permit conditions were addressed. As part of that review completeness issues were addressed per Division Order 92-A. The response to Division Order 92A (Amendment 93-A), was determined adequate on December 2, 1993. Division Order 92A was approved on the stating that all deficiencies identified in the November 25, 1992 deficiency memo were to be addressed and were not determined resolved until thoroughly reviewed. Therefore, the Midterm Review determined which requirements were necessary to address unresolved issues from the November 25, 1992 deficiency response.

The Permittee provided an additional change, by removing the commitment to monitor the Alternate Sediment Control Areas (ASCA) if practicable. The Division recently has considered ASCA to have water quality monitoring requirements apply when the Division of Water Quality has included these areas in the UPDES permit.

The following were identified as outstanding deficiencies, based on the previously described scenario, and were to be addressed in this amendment.

ANALYSIS

The following were determined incomplete responses to D.O. 92-A:

1. *A permanent wasterock site, currently approved according to the R645 requirements, should be provided by the Permittee until approval of the proposed waste rock site is granted. The Permittee did not meet the requirements of D.O. 92-A #2, as required by R645-300-143.*



(See January 8, 1992 letter from the Division of Water Rights.)

Analysis:

The Permittee responded to this issue within the context of the response letter: not, the plan. The Permittee stated that the Soldier Creek Mine is not currently producing waste rock beyond that being disposed of underground. Currently exploration work is being completed at the Dugout Canyon Mine. The Permittee anticipates future permitting and development of a wasterock site to be used by the Dugout and Soldier Canyon Mine.

During the interim period, if Soldier Canyon Mine does produce some incidental waste rock which needs surface disposal, the company will amend the Skyline Mine and Soldier Creek mine permits to allow disposal of waste rock at the Approved Skyline Mines Scofield site.

Findings:

The Permittee has not fulfilled the requirements of this deficiency.

2. *Table 7.24-2 page 7-8 does not reflect Sunoco as owner of water right title 91-203. The Permittee has since changed owners and the proper water right owner should now be identified. The Permittee did not meet the requirements of D.O. 92-A #3, as required by R645-300-143. The Permittee has not met the requirements of R645-301-724.100. (See January 8, 1992 letter from the Division of Water Rights.)*

Analysis:

The Permittee changed Page 7-8 to reflect current owner of water rights Title 91-203 as Sagepoint Coal Company, which is a subsidiary of Coastal States Energy Co.

The remainder of Table 7.24-2 will be amended and brought up to date when the Soldier Canyon Mine Permit is amended to include the Alkali Coal Lease. Therefore, the 39 water rights, filed with the Division of Water Rights, within and adjacent to the Life of Mine Boundary have not been incorporated by the Permittee (See January 8, 1992 letter from the Division of Water Rights).

Finding:

The Permittee has not met the identified requirements.

3. *The Permittee did not meet the requirements of D.O. 92-A #4, as required by R645-300-143. The Permittee has not met the requirements of R645-301-724.100. Soldier Creek Coal Company must provide a commitment in the Mining and Reclamation Plan to coordinate with the Division of Water Rights immediately upon the determination that a water source has been impacted by mining operations. (See January 8, 1992 letter from the Division of Water Rights.)*

Analysis:

In Section 7.31 "General Requirements", the Permittee provided the following commitment; "Should mining operations have an impact on a water established water right, this information will be coordinated with the Utah Division of Water Rights."

The commitment made by the Permittee meets this requirement. It is assumed the Permittee will also be coordinating with the Division and other concerned or governing agencies.

Findings:

The Permittee meets the requirements of the identified deficiency. It is assumed the Permittee will also be coordinating with the Division and other overseeing agencies.

4. *The following are inadequate response to the requirements of Stipulation 6.*
 - a) *The Permittee must include a map survey showing the potential recharge areas in the permit. Fracture zones identified in the mining process should be identified and referenced as potential recharge zones as required by R645-301-724.600, Survey of Renewable Resource Lands.*
 - b) *The LOM area when used should be used consistently throughout the plan; see pages 7-25 and 7-34. Provide consistent representative information for the estimated groundwater storage and recharge in LOM area and Hydrogeologic basins.*
 - c) *The monitoring "assessment", to take place throughout the year during the mining process, was not described as to the degree of the assessment; i.e., what parameters will be monitored/described this proposal does not meet the requirements of R645-301-731.210 and R645-301-730.*
 - d) *The following potential hydrologic impacts are not assessed through the existing in-*

mine monitoring plan and therefore the Permittee does not meet the requirements of R645-301-731.211.

- i. The interception of perched aquifers which issue as a spring would not be monitored through the proposed in-mine monitoring schedule. The proposed annual inventory potentially misses "unusual" in-flows if an area is closed prior to completing the inventory. A qualitative analysis to identify the source characteristic of the intercepted aquifer would be unavailable.*
 - ii. The Permittee has not described how the proposed annual sampling plan is adequate to determine seasonal variations in-flow thus potential impacts on the hydrologic balance, including variations due to recharge functions.*
 - iii. The Permittee has not demonstrated that flows of 50 GPM will adequately monitor for all potential impacts as required under R645-301-731.210. The Permittee has not described how the proposal will meet the quality and quantity and frequency sampling requirements. The Permittee should commit to a minimum time period in which to notify the Division and other agencies of these high magnitude inflows.*
- 5. The Permittee does not have a series of wells to describe the aquifer below the lowest seam to be mined. However, Spring 6 emanates from the Aberdeen tongue below the coal seams in Dugout Canyon and may describe this system. The Permittee should discuss the area of recharge to this Spring 6 using site specific information as required by R645-301-731 and R645-301-731.211. Hydrogeologic structures from drill logs, and/or relative location and flow direction may support the conclusion that this spring will not be impacted.*

Analysis:

The Permittee realizes the identified issues are complex and does not feel there is enough data presently available to adequately respond to these questions. Additional studies are being conducted by Dr. Mayo, under contract by the Permittee, to develop an updated PHC for the Soldier Canyon Mine and proposed Alkali Tract lease area.

On April 6, 1995, an informal meeting will be conducted between Dr. Mayo, the mine representatives and DOGM, to discuss the processes and approach to be used by Dr. Mayo to address these issues and construct the PHC. The deficiencies listed above have not been addressed at this time.

Finding:

The Permittee has not met the requirements of this section.

6. *The Permittee should either properly redevelop the Well 6-1 or follow the requirements for well closure as required by R645-301-731.215. Redevelopment is required for the Permittee to maintain this well as is proposed in the current mine plan. This well could provide important information through bond release to determine flooding of the mine workings.*

Analysis:

The Permittee proposes the final disposition of Well 6-1 be determined as part of the contract with Dr Mayo.

Findings:

The Permittee has not met the requirements of this section.

7. *The Permittee has provided Figure 7.31-9 for Well 6-1. The scale used to present the information is inadequate. The Permittee should present a scale in feet rather than thousands of feet to provide a clear figure per R645-301-121.*

Analysis:

The Permittee has enclosed a revised Figure 7.31-9. This figure more accurately represents the well water elevations. The Permittee has presented a scale of 5 feet per tick mark.

Findings:

The Permittee has met the intent of this deficiency and has clearly represented the water elevation for this well.

8. *The figure heading, in Figure 7.24.7, incorrectly describes the information presented. The Permittee provides the depth to water from the well casings not the water level elevation as indicated. Because the elevations have no relative base elevation the presentation of data is*

unclear. The Permittee has not met the requirements of R645-301-121.

Analysis:

The Permittee has enclosed a revised Figure 7.24.7. This figure more accurately represents the well elevation. The Permittee has presented the wells with a relative base elevation.

Findings:

The Permittee has met the intent of this deficiency and has represented the water well elevations with relative base elevations.

Additional Requirements:

- 1) *The Permittee's present plan indicates drill hole 6-1 is expected to remain as a viable water monitoring point beyond the originally proposed 1993 longwall extraction. The Permittee committed to reassessing well monitoring sites in conjunction with the re-evaluation of the long-term mine plan. The Permittee is not conducting the operations according to the approved permit R645-300.142. Therefore, reassessment should be completed at this time.*

Analysis:

The Permittee is currently assessing well monitoring sites in connection with their contract with Dr. Mayo.

Finding:

The Permittee is in compliance with the approved permit but is not in compliance with R645-301-731.215 at this time. The Permittee is currently exploring and formulating new mining proposals to address this issue.

- 2) *Information in the plan is not current and concise information as required by R645-301-121. According to discussion with the Permittee, proposed waste rock site, longwall mining, and processing plant operations identified in the current plan will not be pursued within the upcoming permit term. The Permittee should update the plan to identify the proposed dates of the Fan Portal Area, the waste rock site and the preparation plant construction per R645-*

301-526.113. The Permittee should update the proposed mine sequence and timing due to the change in the proposed longwall mining operations.

Analysis:

The Permittee responded in the associated deficiency response memo stating "...the Soldier Creek Coal Company is not yet in a position to make any major changes in the approved MRP. The approved plans for a waste rock site, longwall mining and processing plant operations are still viable potential operations." For clarification: The Permittee has been informed that the waste rock site and other proposed operations have not been approved by the Division, in the December 6, 1994 midterm review under "Remaining Deficiencies and Requirements". In order to determine if the existing plan is accurate, the Division should review Mining Sequence Maps for the five year permit term. These should be in-line with the current operations.

Findings:

The Permittee is not considered to be in compliance with R645-301-121. Information in the plan is not current and concise.

Recommendation:

The following Pages related to my review should be approved and incorporated into the mining and reclamation plan pages 7-8, 7-36, 7-118, 7-105. Page 7-163 has already been incorporated into the plan. The Permittee removed the commitment to monitor the Alternate Sediment Control areas if practicable from page 7-164. This is in-line with the current Management Direction at the Division and therefore may be incorporated into the plan.

The following are unresolved permit requirements which should be addressed prior to or in conjunction with any additional permitting actions.

- 1. A permanent wasterock site, currently approved according to the R645 requirements, should be provided by the Permittee until approval of the proposed waste rock site is granted. The Permittee did not meet the requirements of D.O. 92-A #2, as required by R645-300-143. (See January 8, 1992 letter from the Division of Water Rights.)*
- 2. The Permittee did not meet the requirements of D.O. 92-A #3, as required by R645-300-143. The Permittee has not met the requirements of R645-301-724.100. (See January 8, 1992*

letter from the Division of Water Rights.) -

3. *The following are inadequate response to the requirements of Stipulation 6.*
 - a) *The Permittee must include a map survey showing the potential recharge areas in the permit. Fracture zones identified in the mining process should be identified and referenced as potential recharge zones as required by R645-301-724.600, Survey of Renewable Resource Lands.*
 - b) *The LOM area when used should be used consistently throughout the plan; see pages 7-25 and 7-34. Provide consistent representative information for the estimated groundwater storage and recharge in LOM area and Hydrogeologic basins.*
 - c) *The monitoring "assessment", to take place throughout the year during the mining process, was not described as to the degree of the assessment; i.e., what parameters will be monitored/described this proposal does not meet the requirements of R645-301-731.210 and R645-301-730.*
 - d) *The following potential hydrologic impacts are not assessed through the existing in-mine monitoring plan and therefore the Permittee does not meet the requirements of R645-301-731.211.*
 - i. *The interception of perched aquifers which issue as a spring would not be monitored through the proposed in-mine monitoring schedule. The proposed annual inventory potentially misses "unusual" in-flows if an area is closed prior to completing the inventory. A qualitative analysis to identify the source characteristic of the intercepted aquifer would be unavailable.*
 - ii. *The Permittee has not described how the proposed annual sampling plan is adequate to determine seasonal variations in-flow thus potential impacts on the hydrologic balance, including variations due to recharge functions.*
 - iii. *The Permittee has not demonstrated that flows of 50 GPM will adequately monitor for all potential impacts as required under R645-301-731.210. The*

Permittee has not described how the proposal will meet the quality and quantity and frequency sampling requirements. The Permittee should commit to a minimum time period in which to notify the Division and other agencies of these high magnitude inflows.

4. *The Permittee does not have a series of wells to describe the aquifer below the lowest seam to be mined. However, Spring 6 emanates from the Aberdeen tongue below the coal seams in Dugout Canyon and may describe this system. The Permittee should discuss the area of recharge to this Spring 6 using site specific information as required by R645-301-731 and R645-301-731.211. Hydrogeologic structures from drill logs, and/or relative location and flow direction may support the conclusion that this spring will not be impacted.*
5. *The Permittee should either properly redevelop the Well 6-1 or follow the requirements for well closure as required by R645-301-731.215. Redevelopment is required for the Permittee to maintain this well as is proposed in the current mine plan. This well could provide important information through bond release to determine flooding of the mine workings.*
6. *Information in the plan is not current and concise information as required by R645-301-121. The Permittee should update the plan to identify the proposed dates of the Fan Portal Area, the waste rock site and the preparation plant construction per R645-301-526.113. The Permittee should update the proposed mine sequence and timing due according to changes in proposed longwall mining operations.*



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

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December 6, 1994

Rick Olsen, President
Soldier Creek Coal Company
P. O. Box 1029
Wellington, Utah 84542

Re: Mid-Term Review, Soldier Creek Coal Company, Soldier Canyon Mine,
ACT/007/018, Folder #3, Carbon County, Utah

Dear Mr. Olsen;

The Division has completed the Mid-Permit term review for the Soldier Canyon Mine. The major topics reviewed were: Plan Amendments, Bond, #3 Fan Reclamation, and Permit Stipulations. Enclosed is a copy of the review document. Please examine the review document carefully, making particular note of the requirement sections. Soldier Creek Coal Company must complete the requirements as indicated by no later than February 5, 1995.

Please call if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Daron R. Haddock".

Daron R. Haddock
Permit Supervisor

Enclosure

cc: P. Grubaugh-Littig
S. Falvey
P. Baker
W. Western

COVERMID.SC3



Soldier Canyon Mine Midterm Review
Soldier Creek Coal Company
ACT/007/018

This document constitutes the Midterm Review for the Soldier Canyon Mine. The major topics of review were identified in the Division's letter dated August 19, 1994 and are found below in large bold print. Plan deficiencies requiring correction are found at the end of the Bond Review section, the #3 Fan Reclamation section and the Permit Stipulation Section.

Plan Amendments

The following were approved amendments during this permit term:

Coal Handling Facilities 94-A	Approved March 9, 1994
Underground Storage Tank Removal 93-B	Approved Feb. 3, 1994
Response to DO92A Amendment 92-E	Approved December 2, 1993
N93-38-13 Abatement	Approved December 22, 1993
Pond Clean Out Procedure 93-C	Approved December 9, 1993
Permit Transfer	Approved September 14, 1993
Revised Chapter 1 93-A	Approved May 6, 1994
Revised Subsidence Zones	Approved January 21, 1993

Bond Review

Analysis

The reclamation bond at the Soldier Canyon Mine is for \$3,327,909. The direct reclamation costs are \$2,597,007 and the indirect costs are \$640,902.

Earthwork and seeding cost for the refuse site (waste rock disposal) account for \$566,717 of the direct reclamation costs and \$706,649 of the total costs. However, the refuse site was never constructed and the Operator no longer plans to build the facility.

Indirect demolition costs are \$579,480 which includes estimates for structures associated with the wash plant but were never built. The reclamation costs for the foundations, footers and floors, and debris disposal was not included. Usually those costs equal or exceed building demolition costs.

The over bonding for the wash plant compensates for the under bonding for the foundations, footers, floor and disposal costs. The mine appears to have an adequate reclamation bond at this time and no adjustment is needed at this time. When the permit is renewed, the Operator must submit updated bond calculations that include demolition cost estimates for foundations, footers and floor. Disposal costs must also be included in the bond estimate.

The Division informally notified the Operator of the deficiencies in the reclamation bond calculations. He has measured the foundations, floors and footers for most of the buildings as preparation for updating the bond calculations. There is no time frame for when the updated calculations will be submitted to the Division.

Requirements

No adjustment to the reclamation bond is needed at this time, however, the Operator must be required to submit information on the demolition cost associated with demolition of foundations, footers and floor besides disposal fees.

#3 Fan Reclamation

Analysis

Soldier Creek's mining and reclamation plan commits to either develop or reclaim the No. 3 fan site by 1994. They have verbally proposed to postpone reclamation at the fan site indefinitely. This would require a permit change.

Perennial vegetative cover at this site has not been measured, but it is probably less than what could be achieved under optimum circumstances. There are some areas where more perennial vegetation would help to control weeds, and the cut slopes could also be enhanced. With these improvements, the site would be better suited for being in a "temporarily stabilized" condition for a long period.

Soldier Creek should take the following measures to increase the amount and improve the composition of vegetation on the No. 3 fan site:

1. Supplement the 1991 seeding with another seeding of the interim revegetation seed mixture.
2. Attempt to control musk thistle, a state-declared noxious weed that has been found growing in a few places at this site.
3. Try to establish vegetation on the cut slopes by propagating virgin's bower (*Clematis ligusticifolia*) already growing on some of the slopes. Personnel at the Lone Peak State Nursery believe virgin's bower can probably be propagated by hardwood cuttings in the spring. Another option would be to try to collect and plan seed this fall. This plant is a vine that tends to establish well and cover disturbed slopes

Requirements

1. The No. 3 fan site must be reclaimed according to the current plan or in order to postpone reclamation at the No.3 fan site, Soldier Creek must amend the plan. The site requires better stabilization through supplemental interim revegetation.

Permit Stipulations

There were 6 special conditions attached by Division Order #92A to the Permit Renewal issued on February 3, 1992. Following is a review of those conditions:

The response to Division Order 92A was made as an amendment to the plan and was assigned the tracking number 92-E. The amendment was approved on December 2, 1993 on the basis that all deficiencies identified in the January 27, 1992 deficiency review had been addressed by the Operator. The approval indicated that unresolved issues identified in subsequent reviews would require further action. This review focuses on those items.

Analysis

- 1) ***R645-100-200 and R645-301-525.270: There are no provisions for permitting of all areas potentially affected by subsidence resulting from approved coal extraction.***

This condition was adequately addressed and considered resolved as of December 2, 1993.

- 2) ***R645-301-536: Exhibit 5-21-1a must be revised to delete the storage of coal mine waste on the surface.***

This exhibit was not changed in Amendment 93-A. Currently the Operator is storing waste rock at the location shown on Exhibit 5-21-1a. The Operator does not have a permanent surface storage area at this time. The Operator has waste material piled at the waste rock location presently. A final storage area should be identified.

- 3) ***Soldier Creek Coal Company must update the title for water right 91-203 to Sunoco and provide the Division with a commitment to protect all water sources to the extent possible. (See January 8, 1992 letter from the Division of Water Rights).***

The Operator does not reflect the proper owner of water right title 91-203 on Table 7.24-2, page 7-8. The Operator has changed owners and the proper water right owner should now be identified. A commitment to protect all water sources to the extent possible could not be located.

However, the Operator does reiterate the regulation objective to minimize disturbance to the hydrologic balance within the permit and adjacent areas in Section 7.50 under Performance Standards.

- 4) ***Soldier Creek Coal Company must provide a commitment in the Mining and Reclamation Plan to coordinate with the Division of Water Rights immediately upon the determination that a water source has been impacted by mining operations. (See January 8, 1992 letter from the Division of Water Rights)***

The Operator makes a statement that any adverse effects to domestic stock and wildlife sources will be mitigated, as described in Section 7.28, on page 7-82. In Section 7.28, page 7-93, the Operator indicates that impacts to perennial springs or seeps will have contingency plans implemented. The contingency plan proposed will coordinate losses of major inflows from Soldier Creek with the regulatory agency. These proposals do not meet the request for notification and coordination of "a water source" impacted by mining. As indicated in the January 8, 1992 letter "diminution or interruption of flows from any source (caused by mining) should be considered significant and be addressed accordingly".

- 5) ***Soldier Creek Coal Company must provide to the Division of Water Rights and the Division of Oil, Gas and Mining, clarification regarding the status of the old borings discussed on page 17 of the Supplemental Hydrogeologic Study by Sergeant, Hauskins, & Beckwith (Appendix I). (See January 8, 1992 letter from the Division of Water Rights)***

The Operator commits to plug cap and seal boreholes and wells as described in Section 6.30, page 6-19 (revised 10/91). Specific mention of the old borings discussed in the supplemental study were identified in Section 7.65, page 19, revised 06/1/93. The Operator should update the plan at the time that monitoring holes SC-2, SC-8 and SC-10 are mined out.

- 6) ***Soldier Creek Coal Company must adequately address all outstanding issues discussed in the Divisions's Technical Deficiency Review Dated January 27, 1992.***

Following is a discussion of and final determination of the status of the items identified in the January 27, 1992 review.

722. Cross Sections and Maps.

4. ***Provide text in the MRP where Appendix 7-I's SHB supplemental report is referenced. Include a summary of what information was changed on Plate 1 and why or, the original plate may be submitted.***

The Operator includes Plate 1 in the September 8, 1992 submittal. The Operator indicates the plate is not revised within the September 8, 1992

submittal. The plate was not reviewed for changes, however the map has a statement that it is updated. According to a phone conversation with Tom Paluso on August 16, 1994 the update consisted of certification only. The Operator is considered to have adequately addressed this deficiency.

6. ***Elevation and depth of well SC-1 must be included on applicable map(s). Text referencing maps of well locations should include all applicable maps.***

The depth of surface wells are shown on Exhibit 7.21-1. According to the Operator's memo received March 29, 1993 drill hole SC-1 was used to determine the separation between Rock Canyon and Sunnyside seams and was not intended to be a water monitoring hole.

The Operator has included a foot note on Exhibit 7.21-3, in the March 29, 1993 submittal. No reference changes were included in text. Although the cross-reference is not specifically referenced in text, a person referencing the map would eventually find the additional map. The Operator is considered to have addressed this deficiency.

724. Baseline Information.

1. ***Text and Exhibit 7.21-1 still do not indicate whether or not there are water rights between Anderson Reservoir and the Price River.***

Should the Applicant propose new lease areas, additional rights must be identified. The Division indicated it would be necessary to re-analyze the area of impact during the waste rock site expansion review. The Operator currently does not know when the waste rock site will be pursued further (ref. January 14, 1993 Memo).

2. ***Provide a discussion summarizing seasonal use and seasonal quantity. The seasonal quantity would include analysis of seasonal baseline flows. Current operational flows may also provide useful information.***

In the September 8, 1992 submittal, the Operator has dropped water rights which the Operator considered to be outside the area of impact. The current search area is within one mile of the LOM boundary of the Soldier Creek Mine (May 7, 1993 Submittal).

The May 7, 1993 submittal indicates that Table 7.24-2 and Exhibit 7.21.2 are updated. The table includes the period and quantity of use of various water

rights. Also the text of the permit document has been modified to describe seasonal use of rights.

Qualitative summaries of seasonal fluctuations of quantity are presented in the applicable section of the MRP. The Operator states that quantitative summaries of the discharge fluctuations are presented in Appendix 7-I. See Table 7.24-4.

The Operator is considered to have adequately addressed this deficiency at this time.

724.600. Survey of Renewable Resource Lands.

2. *The Operator must include a map survey showing the potential recharge areas in the permit boundary.*

The Applicant states that recharge areas in the Book Cliff occur directly through streamflow and direct infiltration into sandstone outcrops and alluvium. The Operator references geologic map Exhibit 6.22-7 as the survey showing the potential recharge locations in the permit area.

In Section 6.42, page 6-7, the Operator indicates no major faulting has been identified in the LOM area but, fractures appear parallel to the strike of the Book Cliffs Escarpment. The Operator indicates most fractures are not appreciably open or extensively connected. However, the Operator does indicate bedding contacts and joints are higher permeabilities page 7-19 (revised 6/1/93).

The underground mining map and text within Chapter 7 indicates a significant fracture, relative to the mined area, was intercepted during mining. This area has resulted in-mine flows, yet this structure is not addressed as a potential recharge zone. The Operator has indicated that the fracture does not appear to be directly tied to the surface because of the presence of methane gas. The presence of the gas may substantiate that a large direct opening is not present. However, increased recharge may occur through indirect jointing and fractures in the area. The referenced map shows some minor fractures (not those encountered during mining): however, the Operator has not suggested fractures as potential recharge features.

724.700. Meet the AVF requirements of R614-302-320.

1. *The Operator must incorporate AVF information from the current MRP that*

supports the original determination made by the Division.

The Operator has provided revised information on pages 9-1 through 9-8 (rev. 9/8/92). The Operator indicates that segments of drainage contain discontinuous patches of unconsolidated alluvial deposits which are not mapped (page 9-1). There are no man caused flood irrigation or sub-irrigation areas within the LOM area (page 9-2). Flood irrigation may be possible on small areas within the LOM but, these areas are not practicable for irrigation. South of the proposed LOM area along Soldier Creek an AVF determination was made by DOGM "Based on hydrologic data from the Soldier Canyon permit document, no significant reduction in the water supply is anticipated since surface water will not be removed from Soldier Creek for any industrial use..."

Information contained on pages 9-1 through 9-3 is taken from the February 4, 1987 permit document, Volume 2, Section 3.8. The permit approval indicates that no lands designated as alluvial valley floors occur on the permit area. The attached CHIA indicates a negative determination based on the studies conducted by Sunedco Coal Company in the approved Sage Point Dugout Canyon mine plan. Specifically, the unconsolidated stream lain deposits, and insufficient water quantities available to support agricultural activities within the mine plan area, lead to a negative determination. Letters of prime farmland determinations previously contained in Section 3.9 were found in Appendix A. A potential AVF was identified downstream of the mine site.

Although surface water is not being removed for industrial use, the timing of discharge and quantity of discharge has changed through mining activities. This creates an increased flow during the summer season while the mine is in operation. Following mining, flows may be considerably diminished for a time period until the mine recharges to a level where natural discharge again occurs. The potential to change seasonal flow regimen is high. The water discharged from the mine reports to the Anderson Reservoir, a man-made impoundment used for irrigation waters. Prior to approval of the waste rock site the Division will be required to make an AVF determination.

726. Modeling.

- 1. The Operator shall clarify the text of the application to identify all modeling used and presented in the MRP.*

Section 7.26 was modified to reflect modeling used. The Applicant references numerical simulation model GWSIM-II. The Operator is considered to have

adequately addressed this deficiency.

728. PHC determination

1. *The Spring identified as #7 on Exhibit 7.21-1 is in an area of possible subsidence from longwall mining, yet is not being monitored.*

The Operator no longer proposes to longwall mine this area. Should the Operator again pursue longwall mining in this area, or have a potential for subsidence from room and pillar mining the plan should be reviewed to consider this spring for PHC and monitoring needs.

2. *The in-mine consumptive use needs to be updated to project current and proposed conditions. Actual volumes of water discharged from within the mine to Soldier Creek must be quantified and included in analysis of ground water losses due to mining the area.*

Figure 7.28-1 through 7.28-26 have been included to graphically detail quantity and quality of ground water intercepted by the mine over recent years.

In mine consumptive use is predicted in Section 7.28, page 7-98, revised 6/1/93. The Operator estimates a maximum 50.5 AF could be added annually to coal produced assuming maximum production of 3,009,000 tons, an inherent coal moisture of 4% and run of mine moisture 6.28%. The Operator estimated annual loss due to evaporation at 37.5 AF is based on 1,500,000 ft³/min entering the mine at 46% humidity and leaving the mine at 67% humidity. The maximum annual consumption of water is estimated to be 88.0 AF.

The Operator has not described the basis for the value used to estimate air entering the mine. Values such as water added to coal is estimated as a maximum value however, the value estimated for evaporation is less than maximum since the value was exceeded in 1991 with 45 AF of evaporation. Additionally, existing data for the run of mine moisture has been higher than the values used in this "maximum" estimate. The Operator appears to be mixing maximum and average values to arrive at a maximum estimate. However, the Operator's final estimate of 88.0 AF is a conservative estimate simply because the existing coal removal rate is much lower than what is proposed. The Operator should be aware of the inconsistency in the method used and be aware that the estimation is approaching the limit of the quantity of use for the ground water right 91-203 (assuming the quantity of use is 0.25

AF per day, see Table 7.42-2).

The Operator has included water discharged from the mine annually, from 1985 through 1991, in Figure 7.28-1. The total water discharged from 1985 through 1993, as determined from annual reports, is approximately 4,487 AF.

3. ***Figures used to arrive at all estimates should be clearly presented in the appendix or text of the MRP.***

The Operator's response memo states that Figures 7.28 -1 through 7.28-26, Appendix 6-B and Appendix L, have been added to the MRP to supplement the PHC information.

Appendix 6-B includes monitoring well geologic logs. Appendix L includes hydrologic data prepared for the Sagepoint/Dugout Canyon application and includes aquifer properties and ground water data evaluation including a falling head test.

Ground water storage for the Blackhawk formation is estimated to be 490,000 AF over the LOM area. This analysis is based on an LOM area of 4,900 acres, an average saturated thickness of 1,000 feet and a storage coefficient of 0.10. The Operator estimates the quantity of recharge over the LOM area using 10.35 mi² (pg.7-25) and later calculates the LOM area as 7.66 mi² or 4,900 acres (pg. 7-34). The areas used to describe the system should be consistent throughout the plan.

Impacts, as described under Ground Water Discharge (pg.7-34), should be determined based on hydrogeologic sub-basins. The hydrologic sub-basin may be determined through stratigraphy of drilling and well logs and geologic controls as presented in Exhibit 6.22-6. As the life of mine area increases with lease additions impacts to specific drainages should be quantified. Currently the Operator has adequately described the potential impacts in site specific terms according to the information in Exhibit 6.22-6. However, if the Operator mines beyond the Soldier Creek geohydrologic basin additional baseline information could be necessary. The Division should address the needs for this information based during CHIA updates, or at the addition of new lease areas.

4. ***Include Probable Hydrological Consequence based on flooding including the potential of sediment contributions to streamflow.***

In the section, Flooding or Streamflow Alteration, page 7-103 and 7-104, revised 6/1/93, the Operator states the natural channel of Soldier Creek has the

capacity to pass the peak flow greater than the 100-year, 6-hour event. The probability that an occurrence exceeding the design event in 30-years Life of Mine is 26%, and such an event would increase sediment loading slightly but be temporary in nature. Impacts to downstream resources are expected to be minimal because of the lack of development and utilities. Exceptions are power lines to the mine and an agricultural area 4 miles downstream.

Following reclamation interim sediment-control measures and maintenance of the reclaimed area will preclude deposition of significant amounts of sediment in downstream channels following reclamation. Thus maintaining the hydraulic capacity of the channel and precluding adverse flooding impacts.

The Operator is considered to have adequately addressed this deficiency at this point in time. However, additional information may be requested as issues arise through updated CHIA determinations.

5. *Provide the Probable Hydrologic Consequences on the Price River and Castle Gate formation.*

A discussion of the PHC on the Price River formation and North Horn formation was found on page 7-90, revised 6/1/93. The Operator's references indicate the regional aquifer exists above the minable coal seams (pg 7-28). The Price River formation and Castlegate member probably have occurrences of water in perched aquifers of limited extent. Based on the low hydraulic conductivity and separation of workings from the overlying water bearing member there is a low probability that water would be intercepted by mining operations according to the Operator. On the other hand, the Operator states the Northhorn and Price River formation are stratigraphically closer to the proposed underground mining activity. The impact would be greater to the flow from these formations than the Flagstaff limestone (page 7-92, 6/1/93 submittal). The Operator is considered to have addressed this deficiency unless further issues arise through review and data analysis.

R645-301-730 Operation Plan

1. *A copy of the NPDES permit is not in the MRP where it can be reviewed by the Division and potentially affected parties, before operations sending industrial wastes to the pond commence.*

The UPDES/NPDES permit was incorporated in Section 5 illustration 5.26-1 and was incorporated on December 1, 1993.

2. *The information in the reply to the original deficiency, found on page 6 of the Technical Deficiency Review Outline, should be incorporated into the MRP.*

The Operator indicated discharge to the sediment pond, from the proposed preparation plant, would be allowed during emergencies and DWQ would need to be notified of the discharges. This information was included in Section 5.26.22 (1.3), page 5-36, revised 3/31/93. Additional references are contained in the UPDES permit page 21, item J and page 18, item J. The Operator has decided not to develop the preparation plant at this time. At such time as the Operator pursues development this issue may be revisited per additional monitoring and notification requirements and/or lining the pond with clay.

731.200 Ground Water Monitoring

1. *The Operator must define "significant" measurable flow and provide justification for the definition.*

The Operator has proposed three in-mine monitoring scenarios; assessment of inflows throughout the year, a complete fall inventory, and sampling for inflows greater than 50 GPM. The Operator suggested the change, from the previous quarterly in-mine monitoring for flows of 5 GPM or greater, following a decrease in coal production at the mine. The Operator did provide some information in figures to show the pattern of measured flows and changes in total dissolved solids over time. However, a relationship between existing data, the proposed monitoring plan, and the potential hydrologic impacts was not developed.

The monitoring "assessment" to take place throughout the year during the mining process was not specific as to the degree of the assessment; i.e., what parameters will be monitored/described. The Operator should identify what information will be provided for the assessment of mining progress inventory. At a minimum the description should include type of inflow source(s), quantity and quality of flows.

Monitoring for "unusual flows" - those flows that are of greater volume than the general run-of-mine in-flows, and/or flows which come from a reasonably discreet source area; generally not influenced by waters used in mining process, are not monitored through the proposed program. These sources are potentially connected to perched aquifers which issue as a spring(s). These flows should be quantitatively and qualitatively described to identify the nature/characteristics of the source aquifer.

The Operator states that once mining in a given area is completed access is

generally eliminated. The proposed annual inventory could potentially miss flows from the areas closed following mining. If data were gathered at the initial interception of the source and flow data prior to closure of the area, fewer potential interferences and mixed sources would be sampled. Water coming from the working face or roof, not extensively influenced by water moving along the floor or in the mining process, could be quantitatively identified during the assessment monitoring phase by looking at variation between conductivity and pH. If these parameters suggest a different source further analysis could be performed.

The proposed annual monitoring plan will provide good, general in-mine sources, and will quantify some flows that contribute to the general mine discharge. This proposal will show annual changes for composite sources and a few of the deereet point sources but will not describe seasonal variation. The Operator should describe how the proposed time of sampling is adequate to determine seasonal variations in in-flow. For example, the Operator could use the existing data and discuss variation in flows that may be due to recharge functions to support the proposed analysis. A quarterly analysis of totalized monthly flows discharged from the mine would be helpful in describing seasonal changes.

The Operator has not demonstrated that water quality samples for flows of 50 GPM or greater are adequate to determine the potential hydrologic impacts from the mine. The Operator should provide supporting information from existing and past in-mine monitoring sites to demonstrate that flows of 50 gpm will describe all potentially impacted sources identified in the PHC (perched formation as well as fracture). The Operator should have an initial monitoring plan at interception of significant flows prior to developing a long term plan. The Operator should commit to a minimum time period in which to notify the Division and other agencies.

Initially the proposed increased flow parameter was linked to the rate of production, a change in production should be included as a trigger mechanism to return to previous flow sampling criteria. However, if the Operator responds adequately to these deficiencies the result will be a plan that more adequately describes the in-mine flows.

2. ***The Operator will re-asses proposed well monitoring sites to assure compliance of monitoring potentially impacted aquifers identified by the PHC and meeting other applicable R645 ground water regulations.***

The aquifer below the lowest seam to be mined does not have a series of wells to describe this system. The Sergent Hauskins & Beckwith report of October

1985 was provided to determine hydrogeologic conditions below the Gilson coal seam. Within the LOM there was no development of groundwater in the perched or regional aquifers other than within the mine workings (Section 7.24.1 page 7-4 revised 6/1/93). Wells drilled in the Blackhawk below the Gilson seam were 3.3×10^{-6} to 1.7×10^{-7} cm /sec. With the exception of the 9.5 foot sandstone unit under artesian pressure and Hydraulic conductivity of 1.5×10^{-3} cm/sec.

Spring 6, which emanates from the Aberdeen tongue below the coal seams and surfaces in Dugout Canyon, is not expected to be impacted according to the Operator because it is two miles away. The proximity of the spring to the mined area only has a bearing on impact through time of impacts to reach the spring based on hydraulic conductivity, unless the spring is outside the hydrogeologic basin. If this spring issues from a fracture or bedding plane the potential for impact is higher. The spring's characteristics and hydrogeologic basin may support the Operator's position that this spring would not be impacted. However, that information is not presented. If the spring's recharge area includes the mined area the spring could be impacted by water quality and quantity with a likely increase in flow and TDS as a function of in mine sumps and mining operations. The Operator should discuss the area of recharge to this spring using hydrogeologic structures from drill logs to support their conclusion of no impact.

Increased monthly sampling was recommended in the March 29, 1994 inspection for Well 6-1 but, was not conducted. This particular well monitors a 200 foot zone in the Sunnyside and Rock Canyon seams where mining has occurred. Well 6-1, was found to be dry at 475 feet on June 3, 1994. The Operator performed a second measurement on August 15, 1994, but was again unable to reach the bottom of the well with the water level sounder. Mud, present on the wire and weight, indicate a well failure. The locking cap/cover is missing from the well and therefore no longer meets the administrative rules for water well drillers. Use of a water well must comply with the provisions of the division of water rights rules for water wells. This well is no longer properly maintained. The Operator should, either properly redevelop the well, or follow the requirements for well closure as required by R645-301-731.215. Redevelopment of this well could provide information during the post reclamation phase to determine recharge to the aquifer.

The Operator is pursuing water quality baseline monitoring on the Alkali lease area. The Operator now only has two wells in the mined vicinity: however, no wells are proposed for the new Alkali lease area. There is concern the Operator may not have adequate ground water information for the new lease area with the two existing monitoring wells. The Operator should analyze

available drill logs for the proposed lease area as, an analysis of the drill logs and assess whether additional wells are necessary to describe the ground water for the proposed LOM area.

On pg. 7-35 the Operator indicates no conclusive argument is available for explaining the water level fluctuations identified in wells 5-1, 32-1, and 6-1, and 10-2. Three potential reasons were sighted. First, the potential of variation due to recharge response. Second, the potential of variation due to the interbedded nature of the formation. Third, the wells have not reached equilibrium condition due to hydraulic testing method. However, the Operator has not discussed the relationship of the wells to the fracture and mining activities.

Information provided by Dave Spillman through phone conversations indicates the Operator provided a polyurethane grout from the Sunnyside seam down to the Blackhawk seam where the fracture was originally intercepted. The purpose in sealing the fracture was to seal off methane to allow the Operator to retrieve the coal reserves. In May through June of 1991 the Operator used an estimated 43 thousand lbs of grout in the fracture of the main first east of the Sunnyside seam. In December through January of 1991 in the main north another 43 thousand lbs of grout was used to seal the fracture. The fracture is assumed to be a strike slip according to Dave Spillman as no vertical displacement is evident.

It is interesting to note that the increasing water elevation in well 32-1, leveled off during the grouting period and then continued to increase. This well is located below the seam to be mined and may be connected to mine-water sources through the fracture. Should the well elevation begin to level off at the elevation of the in-mine sumps the hypothesis that there is a connection to mining would be supported.

The Operator should include a discussion in the monitoring plan for Well 6-1. The Operator's present plan indicates drill hole 6-1 is expected to remain as a viable water monitoring point beyond the originally proposed 1993 longwall extraction page 7-190, revised 6/1/93. The Operator commits to a reassessment of well monitoring sites in conjunction with the re-evaluation of the long term mine plan. The Operator should meet this commitment as a part of this review. A summary analysis of all data should be preformed for well 6-1.

The Operator has provided Figure 7.31-9 for well 6-1. The scale used to present the information is inadequate. The Operator should present a scale in feet rather than thousands of feet. The Operator shows additional well

information on Figure 7.24.7. The label incorrectly describes the information presented. The Operator provides the depth to water from the well casings **not** the water level elevation. Because the elevations have no relative base elevation, the presentation of data is misleading.

On page 7-82 the Operator states the regional aquifer in the Blackhawk is low yielding. However, this does not describe the site specific hydrology of the area. From the available water quality data the local hydrology of the Flagstaff and North horn do not appear to have better water-holding characteristics. The Operator should update this section to provide a accurate description of the local or site specific hydrology. (The actual yield from the mined area should be presented).

731.220. Surface Water Monitoring.

- 1. Include analysis for surface water quality according to use in an extended annual parameter list or, demonstrate that the potential for those contaminates do not exist from mining activities.***

Table 7.24-7, page 7-20 includes selected Utah Division of Health numerical standards.

The Operator provided a 5 year extended parameter list in Table 7.31-3. A commitment to complete this list in the quarter prior to the 5 year renewal due date is found in Section 7.31.2.2, page 7-136 revised 6/1/93.

The Operator is considered to have addressed this deficiency. Additional monitoring may be required as conditions change at the site.

- 2. Since the Operator does not propose to monitor the sites G-3 and G-4. Provide a monitoring plan, or sufficient information that will demonstrate that surface flow is not intercepted by the fracture and is separate from in-mine water flows.***

Currently approved surface water monitoring points include G-1, G-2 and G-5. This was authorized in the February 4, 1987, Five Year Permit Approval. Sites G-1 and G-2 were included to replace site G-4. Site G-3 has never been monitored in conjunction with the Soldier Creek Canyon Mine (the site does provide baseline information). Pages 7-93 and 7-97 have been revised to clarify the surface water monitoring points. (September 8, 1993)

In Section 7.28, page 7-91, the Operator indicates the natural base flow of

Soldier Creek may be lessened by the interception of water in the Blackhawk. The Operator suggests sites G-1 and G-2, in the head water area, accommodate the expanded boundaries. It is reasonable to measure the sites located in these areas due to the prevailing direction of ground water movement and base flow contributions. In order to determine potential impacts it would be prudent to maintain sites above and below the region of the fracture zone or zones where the mine is receiving inflows below streams. Location of loss of baseline flow from subsidence or fracture losses would not be discernable with the current monitoring plan. The lower monitoring point may identify potential impacts in decreased base flow by adjusting for mine water discharge. However, it would require additional monitoring to locate the impacted section.

Significant inflows are occurring in the mine along the fracture. The fracture appears to lie under the Soldier Creek and Pine Creek streams. The Operator indicates there is no evidence the fracture extends significantly beyond (above) the Blackhawk formation. However, the fracture may have created a zone of jointing associated with the fracture creating a significant recharge zone or section of losing stream. The Operator refers to Section 7.31.2 for contingency monitoring of stream losses. The only contingency monitoring found in this section is related to inflows greater than 50 GPM. The plan at that time is to notify the Division to develop a plan. However, this plan does not cover changes in flow due to stream losses as a result of a drain on the system; i.e., the ground water voids never fill therefore the stream is constantly a losing stream where as it may have fluctuated seasonally as gaining reach previously. Stream losses spread over a larger area (not direct interception) would not be identified by the proposed method.

The Operator states efforts will be made to sample sites G-1, and G-2 prior to sampling G-5. "Where possible, attempts will be made to sample the surface water stations on the same day", Table 7.31-1. Previous data was seldom sampled on the same day and therefore it would be difficult to make any statement to changes that may have occurred to date.

R645-301-731.300 Acid and Toxic Forming Materials

- 1. Information on identification and permanent disposal of acid and toxic forming waste is in the MRP but is scattered and not concise.*
- 2. Plans for protecting hydrologic resources from acid and toxic drainage from the temporary storage site are not clear and concise.*

Section 7.31.3 the Operator merely repeats the regulatory requirements but does not provide the site specific information required by R645-301-731. Location of references to specifics, such as, but not limited to sediment pond waste removal, should be listed in this section. Drainage around the temporary storage site was not presented by the Applicant.

REMAINING DEFICIENCIES and REQUIREMENTS

Proposals such as the waste rock site, coal washing facilities and longwall mining are no longer being pursued by the Operator within the scope of the 5 year plan. Information in the plan is therefore not representative of existing site conditions and is not current and concise information as required by R645-301-121. The Operator has not received approval for many of the proposed activities at this time. The Operator should remove all "proposed" operations that will not be pursued within this or the upcoming permit term. Additionally, a permanent wasterock site, currently approved according to the R645 requirements, should be provided by the Operator until approval of the proposed waste rock site is granted.

The following were determined incomplete responses to D.O. 92-A:

1. A permanent wasterock site, currently approved according to the R645 requirements, should be provided by the Operator until approval of the proposed waste rock site is granted.
2. Table 7.24-2 page 7-8 does not reflect Sunoco as owner of water right title 91-203. The Operator has since changed owners and the proper water right owner should now be identified. The Operator did not meet the requirements of D.O. 92-A #3, as required by R645-300-143. The Operator has not met the requirements of R645-301-724.100. (See January 8, 1992 letter from the Division of Water Rights.)
3. The Operator did not meet the requirements of D.O. 92-A #4, as required by R645-300-143. The Operator has not met the requirements of R645-301-724.100. Soldier Creek Coal Company must provide a commitment in the Mining and Reclamation Plan to coordinate with the Division of Water Rights immediately upon the determination that a water source has been impacted by mining operations. (See January 8, 1992 letter from the Division of Water Rights.)
4. The following are inadequate response to the requirements of Condition 6.
 - a) The Operator must include a map survey showing the potential recharge areas in the permit. Fracture zones identified in the mining process

should be identified and referenced as potential recharge zones as required by R645-301-724.600, Survey of Renewable Resource Lands.

- b) The LOM area when used should be used consistently throughout the plan; see pages 7-25 and 7-34. Provide consistent representative information for the estimated groundwater storage and recharge in LOM area and hydrogeologic basins.
 - c) The monitoring "assessment", to take place throughout the year during the mining process, was not described as to the degree of the assessment; i.e., what parameters will be monitored/described this proposal does not meet the requirements of R645-301-731.210 and R645-301-730.
 - d) The following potential hydrologic impacts are not assessed through the existing in-mine monitoring plan and therefore the Operator does not meet the requirements of R645-301-731.211.
 - i. The interception of perched aquifers which issue as a spring would not be monitored through the proposed in-mine monitoring schedule. The proposed annual inventory potentially misses "unusual" in-flows if an area is closed prior to completing the inventory. A qualitative analysis to identify the source characteristic of the intercepted aquifer would be unavailable.
 - ii. The Operator has not described how the proposed annual sampling plan is adequate to determine seasonal variations in-flow thus potential impacts on the hydrologic balance, including variations due to recharge functions.
 - iii. The Operator has not demonstrated that flows of 50 GPM will adequately monitor for all potential impacts as required under R645-301-731.210. The Operator has not described how the proposal will meet the quality and quantity and frequency sampling requirements. The Operator should commit to a minimum time period in which to notify the Division and other agencies of these high magnitude inflows.
5. The Operator does not have a series of wells to describe the aquifer below the lowest seam to be mined. However, Spring 6 emanates from the Aberdeen tongue below the coal seams in Dugout Canyon and may describe this system. The Operator should discuss the area of recharge to this Spring 6 using site

specific information as required by R645-301-731 and R645-301-731.211. Hydrogeologic structures from drill logs, and/or relative location and flow direction may support the conclusion that this spring will not be impacted.

6. The Operator should either properly redevelop the Well 6-1 or follow the requirements for well closure as required by R645-301-731.215. Redevelopment is required for the Operator to maintain this well as is proposed in the current mine plan. This well could provide important information through bond release to determine flooding of the mine workings.
7. The Operator has provided Figure 7.31-9 for Well 6-1. The scale used to present the information is inadequate. The Operator should present a scale in feet rather than thousands of feet to provide a clear figure per R645-301-121.
8. The figure heading, in Figure 7.24.7, incorrectly describes the information presented. The Operator provides the depth to water from the well casings not the water level elevation as indicated. Because the elevations have no relative base elevation the presentation of data is unclear. The Operator has not met the requirements of R645-301-121.

Additional Requirements:

- 1) The Operator's present plan indicates drill hole 6-1 is expected to remain as a viable water monitoring point beyond the originally proposed 1993 longwall extraction. The Operator committed to reassessing well monitoring sites in conjunction with the re-evaluation of the long-term mine plan. The Operator is not conducting the operations according to the approved permit R645-300.142. Therefore, reassessment should be completed at this time.
- 2) Information in the plan is not current and concise information as required by R645-301-121. According to discussion with the Operator, proposed waste rock site, longwall mining, and processing plant operations identified in the current plan will not be pursued within the upcoming permit term. The Operator should update the plan to identify the proposed dates of the Fan Portal Area, the waste rock site and the preparation plant construction per R645-301-526.113. The Operator should update the proposed mine sequence and timing due to the change in the proposed longwall mining operations.

Soldier Canyon Mine Midterm Review
Soldier Creek Coal Company
ACT/007/018

This document constitutes the Midterm Review for the Soldier Canyon Mine. The major topics of review were identified in the Division's letter dated August 19, 1994 and are found below in large bold print. Plan deficiencies requiring correction are found at the end of the Bond Review section, the #3 Fan Reclamation section and the Permit Stipulation Section.

Plan Amendments

The following were approved amendments during this permit term:

Coal Handling Facilities 94-A	Approved March 9, 1994
Underground Storage Tank Removal 93-B	Approved Feb. 3, 1994
Response to DO92A Amendment 92-E	Approved December 2, 1993
N93-38-13 Abatement	Approved December 22, 1993
Pond Clean Out Procedure 93-C	Approved December 9, 1993
Permit Transfer	Approved September 14, 1993
Revised Chapter 1 93-A	Approved May 6, 1994
Revised Subsidence Zones	Approved January 21, 1993

Bond Review

Analysis

The reclamation bond at the Soldier Canyon Mine is for \$3,327,909. The direct reclamation costs are \$2,597,007 and the indirect costs are \$640,902.

Earthwork and seeding cost for the refuse site (waste rock disposal) account for \$566,717 of the direct reclamation costs and \$706,649 of the total costs. However, the refuse site was never constructed and the Operator no longer plans to build the facility.

Indirect demolition costs are \$579,480 which includes estimates for structures associated with the wash plant but were never built. The reclamation costs for the foundations, footers and floors, and debris disposal was not included. Usually those costs equal or exceed building demolition costs.

The over bonding for the wash plant compensates for the under bonding for the foundations, footers, floor and disposal costs. The mine appears to have an adequate reclamation bond at this time and no adjustment is needed at this time. When the permit is renewed, the Operator must submit updated bond calculations that include demolition cost estimates for foundations, footers and floor. Disposal costs must also be included in the bond estimate.

The Division informally notified the Operator of the deficiencies in the reclamation bond calculations. He has measured the foundations, floors and footers for most of the buildings as preparation for updating the bond calculations. There is no time frame for when the updated calculations will be submitted to the Division.

Requirements

No adjustment to the reclamation bond is needed at this time. During the permit renewal in 2.5 years the Operator must be required to submit information on the demolition cost associated with demolition of foundations, footers and floor besides disposal fees.

#3 Fan Reclamation

Analysis

Soldier Creek's mining and reclamation plan commits to either develop or reclaim the No. 3 fan site by 1994. They have verbally proposed to postpone reclamation at the fan site indefinitely. This would require a permit change.

Perennial vegetative cover at this site has not been measured, but it is probably less than what could be achieved under optimum circumstances. There are some areas where more perennial vegetation would help to control weeds, and the cut slopes could also be enhanced. With these improvements, the site would be better suited for being in a "temporarily stabilized" condition for a long period.

Soldier Creek should take the following measures to increase the amount and improve the composition of vegetation on the No. 3 fan site:

1. Supplement the 1991 seeding with another seeding of the interim revegetation seed mixture.
2. Attempt to control musk thistle, a state-declared noxious weed that has been found growing in a few places at this site.
3. Try to establish vegetation on the cut slopes by propagating virgin's bower (*Clematis ligusticifolia*) already growing on some of the slopes. Personnel at the Lone Peak State Nursery believe virgin's bower can probably be propagated by hardwood cuttings in the spring. Another option would be to try to collect and plan seed this fall. This plant is a vine that tends to establish well and cover disturbed slopes

Requirements

1. The No. 3 fan site must be reclaimed according to the current plan or in order to postpone reclamation at the No.3 fan site, Soldier Creek must amend the plan. The site requires better stabilization through supplemental interim revegetation.

Permit Stipulations

There were 6 special conditions attached by Division Order #92A to the Permit Renewal issued on February 3, 1992. Following is a review of those conditions:

The response to Division Order 92A was made as an amendment to the plan and was assigned the tracking number 92-E. The amendment was approved on December 2, 1993 on the basis that all deficiencies identified in the January 27, 1992 deficiency review had been addressed by the Operator. The approval indicated that unresolved issues identified in subsequent reviews would require further action. This review focuses on those items.

Analysis

- 1) ***R645-100-200 and R645-301-525.270: There are no provisions for permitting of all areas potentially affected by subsidence resulting from approved coal extraction.***

This condition was adequately addressed and considered resolved as of December 2, 1993.

- 2) ***R645-301-536: Exhibit 5-21-1a must be revised to delete the storage of coal mine waste on the surface.***

This exhibit was not changed in Amendment 93-A. Currently the Operator is storing waste rock at the location shown on Exhibit 5-21-1a. The Operator does not have a permanent surface storage area at this time. The Operator has waste material piled at the waste rock location presently. A final storage area should be identified.

- 3) ***Soldier Creek Coal Company must update the title for water right 91-203 to Sunoco and provide the Division with a commitment to protect all water sources to the extent possible. (See January 8, 1992 letter from the Division of Water Rights).***

The Operator does not reflect the proper owner of water right title 91-203 on Table 7.24-2, page 7-8. The Operator has changed owners and the proper water right owner should now be identified. A commitment to protect all water sources to the extent possible could not be located.

However, the Operator does reiterate the regulation objective to minimize disturbance to the hydrologic balance within the permit and adjacent areas in Section 7.50 under Performance Standards.

- 4) ***Soldier Creek Coal Company must provide a commitment in the Mining and Reclamation Plan to coordinate with the Division of Water Rights immediately upon the determination that a water source has been impacted by mining operations. (See January 8, 1992 letter from the Division of Water Rights)***

The Operator makes a statement that any adverse effects to domestic stock and wildlife sources will be mitigated, as described in Section 7.28, on page 7-82. In Section 7.28, page 7-93, the Operator indicates that impacts to perennial springs or seeps will have contingency plans implemented. The contingency plan proposed will coordinate losses of major inflows from Soldier Creek with the regulatory agency. These proposals do not meet the request for notification and coordination of "a water source" impacted by mining. As indicated in the January 8, 1992 letter "diminution or interruption of flows from any source (caused by mining) should be considered significant and be addressed accordingly".

- 5) ***Soldier Creek Coal Company must provide to the Division of Water Rights and the Division of Oil, Gas and Mining, clarification regarding the status of the old borings discussed on page 17 of the Supplemental Hydrogeologic Study by Sergeant, Hauskins, & Beckwith (Appendix I). (See January 8, 1992 letter from the Division of Water Rights)***

The Operator commits to plug cap and seal boreholes and wells as described in Section 6.30, page 6-19 (revised 10/91). Specific mention of the old borings discussed in the supplemental study were identified in Section 7.65, page 19, revised 06/1/93. The Operator should update the plan at the time that monitoring holes SC-2, SC-8 and SC-10 are mined out.

- 6) ***Soldier Creek Coal Company must adequately address all outstanding issues discussed in the Divisions's Technical Deficiency Review Dated January 27, 1992.***

Following is a discussion of and final determination of the status of the items identified in the January 27, 1992 review.

722. Cross Sections and Maps.

4. ***Provide text in the MRP where Appendix 7-I's SHB supplemental report is referenced. Include a summary of what information was changed on Plate 1 and why or, the original plate may be submitted.***

The Operator includes Plate 1 in the September 8, 1992 submittal. The Operator indicates the plate is not revised within the September 8, 1992

submittal. The plate was not reviewed for changes, however the map has a statement that it is updated. According to a phone conversation with Tom Paluso on August 16, 1994 the update consisted of certification only. The Operator is considered to have adequately addressed this deficiency.

6. *Elevation and depth of well SC-1 must be included on applicable map(s). Text referencing maps of well locations should include all applicable maps.*

The depth of surface wells are shown on Exhibit 7.21-1. According to the Operator's memo received March 29, 1993 drill hole SC-1 was used to determine the separation between Rock Canyon and Sunnyside seams and was not intended to be a water monitoring hole.

The Operator has included a foot note on Exhibit 7.21-3, in the March 29, 1993 submittal. No reference changes were included in text. Although the cross-reference is not specifically referenced in text, a person referencing the map would eventually find the additional map. The Operator is considered to have addressed this deficiency.

724. **Baseline Information.**

1. *Text and Exhibit 7.21-1 still do not indicate whether or not there are water rights between Anderson Reservoir and the Price River.*

Should the Applicant propose new lease areas, additional rights must be identified. The Division indicated it would be necessary to re-analyze the area of impact during the waste rock site expansion review. The Operator currently does not know when the waste rock site will be pursued further (ref. January 14, 1993 Memo).

2. *Provide a discussion summarizing seasonal use and seasonal quantity. The seasonal quantity would include analysis of seasonal baseline flows. Current operational flows may also provide useful information.*

In the September 8, 1992 submittal, the Operator has dropped water rights which the Operator considered to be outside the area of impact. The current search area is within one mile of the LOM boundary of the Soldier Creek Mine (May 7, 1993 Submittal).

The May 7, 1993 submittal indicates that Table 7.24-2 and Exhibit 7.21.2 are updated. The table includes the period and quantity of use of various water

rights. Also the text of the permit document has been modified to describe seasonal use of rights.

Qualitative summaries of seasonal fluctuations of quantity are presented in the applicable section of the MRP. The Operator states that quantitative summaries of the discharge fluctuations are presented in Appendix 7-I. See Table 7.24-4.

The Operator is considered to have adequately addressed this deficiency at this time.

724.600. Survey of Renewable Resource Lands.

2. *The Operator must include a map survey showing the potential recharge areas in the permit boundary.*

The Applicant states that recharge areas in the Book Cliff occur directly through streamflow and direct infiltration into sandstone outcrops and alluvium. The Operator references geologic map Exhibit 6.22-7 as the survey showing the potential recharge locations in the permit area.

In Section 6.42, page 6-7, the Operator indicates no major faulting has been identified in the LOM area but, fractures appear parallel to the strike of the Book Cliffs Escarpment. The Operator indicates most fractures are not appreciably open or extensively connected. However, the Operator does indicate bedding contacts and joints are higher permeabilities page 7-19 (revised 6/1/93).

The underground mining map and text within Chapter 7 indicates a significant fracture, relative to the mined area, was intercepted during mining. This area has resulted in-mine flows, yet this structure is not addressed as a potential recharge zone. The Operator has indicated that the fracture does not appear to be directly tied to the surface because of the presence of methane gas. The presence of the gas may substantiate that a large direct opening is not present. However, increased recharge may occur through indirect jointing and fractures in the area. The referenced map shows some minor fractures (not those encountered during mining): however, the Operator has not suggested fractures as potential recharge features.

724.700. Meet the AVF requirements of R614-302-320.

1. *The Operator must incorporate AVF information from the current MRP that*

supports the original determination made by the Division.

The Operator has provided revised information on pages 9-1 through 9-8 (rev. 9/8/92). The Operator indicates that segments of drainage contain discontinuous patches of unconsolidated alluvial deposits which are not mapped (page 9-1). There are no man caused flood irrigation or sub-irrigation areas within the LOM area (page 9-2). Flood irrigation may be possible on small areas within the LOM but, these areas are not practicable for irrigation. South of the proposed LOM area along Soldier Creek an AVF determination was made by DOGM "Based on hydrologic data from the Soldier Canyon permit document, no significant reduction in the water supply is anticipated since surface water will not be removed from Soldier Creek for any industrial use..."

Information contained on pages 9-1 through 9-3 is taken from the February 4, 1987 permit document, Volume 2, Section 3.8. The permit approval indicates that no lands designated as alluvial valley floors occur on the permit area. The attached CHIA indicates a negative determination based on the studies conducted by Sunedco Coal Company in the approved Sage Point Dugout Canyon mine plan. Specifically, the unconsolidated stream lain deposits, and insufficient water quantities available to support agricultural activities within the mine plan area, lead to a negative determination. Letters of prime farmland determinations previously contained in Section 3.9 were found in Appendix A. A potential AVF was identified downstream of the mine site.

Although surface water is not being removed for industrial use, the timing of discharge and quantity of discharge has changed through mining activities. This creates an increased flow during the summer season while the mine is in operation. Following mining, flows may be considerably diminished for a time period until the mine recharges to a level where natural discharge again occurs. The potential to change seasonal flow regimen is high. The water discharged from the mine reports to the Anderson Reservoir, a man-made impoundment used for irrigation waters. Prior to approval of the waste rock site the Division will be required to make an AVF determination.

726. Modeling.

- 1. The Operator shall clarify the text of the application to identify all modeling used and presented in the MRP.*

Section 7.26 was modified to reflect modeling used. The Applicant references numerical simulation model GWSIM-II. The Operator is considered to have

adequately addressed this deficiency.

728. PHC determination

1. *The Spring identified as #7 on Exhibit 7.21-1 is in an area of possible subsidence from longwall mining, yet is not being monitored.*

The Operator no longer proposes to longwall mine this area. Should the Operator again pursue longwall mining in this area, or have a potential for subsidence from room and pillar mining the plan should be reviewed to consider this spring for PHC and monitoring needs.

2. *The in-mine consumptive use needs to be updated to project current and proposed conditions. Actual volumes of water discharged from within the mine to Soldier Creek must be quantified and included in analysis of ground water losses due to mining the area.*

Figure 7.28-1 through 7.28-26 have been included to graphically detail quantity and quality of ground water intercepted by the mine over recent years.

In mine consumptive use is predicted in Section 7.28, page 7-98, revised 6/1/93. The Operator estimates a maximum 50.5 AF could be added annually to coal produced assuming maximum production of 3,009,000 tons, an inherent coal moisture of 4% and run of mine moisture 6.28%. The Operator estimated annual loss due to evaporation at 37.5 AF is based on 1,500,000 ft³/min entering the mine at 46% humidity and leaving the mine at 67% humidity. The maximum annual consumption of water is estimated to be 88.0 AF.

The Operator has not described the basis for the value used to estimate air entering the mine. Values such as water added to coal is estimated as a maximum value however, the value estimated for evaporation is less than maximum since the value was exceeded in 1991 with 45 AF of evaporation. Additionally, existing data for the run of mine moisture has been higher than the values used in this "maximum" estimate. The Operator appears to be mixing maximum and average values to arrive at a maximum estimate. However, the Operator's final estimate of 88.0 AF is a conservative estimate simply because the existing coal removal rate is much lower than what is proposed. The Operator should be aware of the inconsistency in the method used and be aware that the estimation is approaching the limit of the quantity of use for the ground water right 91-203 (assuming the quantity of use is 0.25

AF per day, see Table 7.42-2).

The Operator has included water discharged from the mine annually, from 1985 through 1991, in Figure 7.28-1. The total water discharged from 1985 through 1993, as determined from annual reports, is approximately 4,487 AF.

3. *Figures used to arrive at all estimates should be clearly presented in the appendix or text of the MRP.*

The Operator's response memo states that Figures 7.28 -1 through 7.28-26, Appendix 6-B and Appendix L, have been added to the MRP to supplement the PHC information.

Appendix 6-B includes monitoring well geologic logs. Appendix L includes hydrologic data prepared for the Sagepoint/Dugout Canyon application and includes aquifer properties and ground water data evaluation including a falling head test.

Ground water storage for the Blackhawk formation is estimated to be 490,000 AF over the LOM area. This analysis is based on an LOM area of 4,900 acres, an average saturated thickness of 1,0000 feet and a storage coefficient of 0.10. The Operator estimates the quantity of recharge over the LOM area using 10.35 mi² (pg.7-25) and later calculates the LOM area as 7.66 mi² or 4,900 acres (pg. 7-34). The areas used to describe the system should be consistent throughout the plan.

Impacts, as described under Ground Water Discharge (pg.7-34), should be determined based on hydrogeologic sub-basins. The hydrologic sub-basin may be determined through stratigraphy of drilling and well logs and geologic controls as presented in Exhibit 6.22-6. As the life of mine area increases with lease additions impacts to specific drainages should be quantified. Currently the Operator has adequately described the potential impacts in site specific terms according to the information in Exhibit 6.22-6. However, if the Operator mines beyond the Soldier Creek geohydrologic basin additional baseline information could be necessary. The Division should address the needs for this information based during CHIA updates, or at the addition of new lease areas.

4. *Include Probable Hydrological Consequence based on flooding including the potential of sediment contributions to streamflow.*

In the section, Flooding or Streamflow Alteration, page 7-103 and 7-104, revised 6/1/93, the Operator states the natural channel of Soldier Creek has the

capacity to pass the peak flow greater than the 100-year, 6-hour event. The probability that an occurrence exceeding the design event in 30-years Life of Mine is 26%, and such an event would increase sediment loading slightly but be temporary in nature. Impacts to downstream resources are expected to be minimal because of the lack of development and utilities. Exceptions are power lines to the mine and an agricultural area 4 miles downstream.

Following reclamation interim sediment-control measures and maintenance of the reclaimed area will preclude deposition of significant amounts of sediment in downstream channels following reclamation. Thus maintaining the hydraulic capacity of the channel and precluding adverse flooding impacts.

The Operator is considered to have adequately addressed this deficiency at this point in time. However, additional information may be requested as issues arise through updated CHIA determinations.

5. ***Provide the Probable Hydrologic Consequences on the Price River and Castle Gate formation.***

A discussion of the PHC on the Price River formation and North Horn formation was found on page 7-90, revised 6/1/93. The Operator's references indicate the regional aquifer exists above the minable coal seams (pg 7-28). The Price River formation and Castlegate member probably have occurrences of water in perched aquifers of limited extent. Based on the low hydraulic conductivity and separation of workings from the overlying water bearing member there is a low probability that water would be intercepted by mining operations according to the Operator. On the other hand, the Operator states the Northhorn and Price River formation are stratigraphically closer to the proposed underground mining activity. The impact would be greater to the flow from these formations than the Flagstaff limestone (page 7-92, 6/1/93 submittal). The Operator is considered to have addressed this deficiency unless further issues arise through review and data analysis.

R645-301-730 Operation Plan

1. ***A copy of the NPDES permit is not in the MRP where it can be reviewed by the Division and potentially affected parties, before operations sending industrial wastes to the pond commence.***

The UPDES/NPDES permit was incorporated in Section 5 illustration 5.26-1 and was incorporated on December 1, 1993.

2. ***The information in the reply to the original deficiency, found on page 6 of the Technical Deficiency Review Outline, should be incorporated into the MRP.***

The Operator indicated discharge to the sediment pond, from the proposed preparation plant, would be allowed during emergencies and DWQ would need to be notified of the discharges. This information was included in Section 5.26.22 (1.3), page 5-36, revised 3/31/93. Additional references are contained in the UPDES permit page 21, item J and page 18, item J. The Operator has decided not to develop the preparation plant at this time. At such time as the Operator pursues development this issue may be revisited per additional monitoring and notification requirements and/or lining the pond with clay.

731.200 Ground Water Monitoring

1. ***The Operator must define "significant" measurable flow and provide justification for the definition.***

The Operator has proposed three in-mine monitoring scenarios; assessment of inflows throughout the year, a complete fall inventory, and sampling for inflows greater than 50 GPM. The Operator suggested the change, from the previous quarterly in-mine monitoring for flows of 5 GPM or greater, following a decrease in coal production at the mine. The Operator did provide some information in figures to show the pattern of measured flows and changes in total dissolved solids over time. However, a relationship between existing data, the proposed monitoring plan, and the potential hydrologic impacts was not developed.

The monitoring "assessment" to take place throughout the year during the mining process was not specific as to the degree of the assessment; i.e., what parameters will be monitored/described. The Operator should identify what information will be provided for the assessment of mining progress inventory. At a minimum the description should include type of inflow source(s), quantity and quality of flows.

Monitoring for "unusual flows" - those flows that are of greater volume than the general run-of-mine in-flows, and/or flows which come from a reasonably discreet source area; generally not influenced by waters used in mining process, are not monitored through the proposed program. These sources are potentially connected to perched aquifers which issue as a spring(s). These flows should be quantitatively and qualitatively described to identify the nature/characteristics of the source aquifer.

The Operator states that once mining in a given area is completed access is

generally eliminated. The proposed annual inventory could potentially miss flows from the areas closed following mining. If data were gathered at the initial interception of the source and flow data prior to closure of the area, fewer potential interferences and mixed sources would be sampled. Water coming from the working face or roof, not extensively influenced by water moving along the floor or in the mining process, could be quantitatively identified during the assessment monitoring phase by looking at variation between conductivity and pH. If these parameters suggest a different source further analysis could be performed.

The proposed annual monitoring plan will provide good, general in-mine sources, and will quantify some flows that contribute to the general mine discharge. This proposal will show annual changes for composite sources and a few of the deereet point sources but will not describe seasonal variation. The Operator should describe how the proposed time of sampling is adequate to determine seasonal variations in in-flow. For example, the Operator could use the existing data and discuss variation in flows that may be due to recharge functions to support the proposed analysis. A quarterly analysis of totalized monthly flows discharged from the mine would be helpful in describing seasonal changes.

The Operator has not demonstrated that water quality samples for flows of 50 GPM or greater are adequate to determine the potential hydrologic impacts from the mine. The Operator should provide supporting information from existing and past in-mine monitoring sites to demonstrate that flows of 50 gpm will describe all potentially impacted sources identified in the PHC (perched formation as well as fracture). The Operator should have an initial monitoring plan at interception of significant flows prior to developing a long term plan. The Operator should commit to a minimum time period in which to notify the Division and other agencies.

Initially the proposed increased flow parameter was linked to the rate of production, a change in production should be included as a trigger mechanism to return to previous flow sampling criteria. However, if the Operator responds adequately to these deficiencies the result will be a plan that more adequately describes the in-mine flows.

- 2. The Operator will re-asses proposed well monitoring sites to assure compliance of monitoring potentially impacted aquifers identified by the PHC and meeting other applicable R645 ground water regulations.***

The aquifer below the lowest seam to be mined does not have a series of wells to describe this system. The Sergent Hauskins & Beckwith report of October

1985 was provided to determine hydrogeologic conditions below the Gilson coal seam. Within the LOM there was no development of groundwater in the perched or regional aquifers other than within the mine workings (Section 7.24.1 page 7-4 revised 6/1/93). Wells drilled in the Blackhawk below the Gilson seam were 3.3×10^{-6} to 1.7×10^{-7} cm /sec. With the exception of the 9.5 foot sandstone unit under artesian pressure and Hydraulic conductivity of 1.5×10^{-3} cm/sec.

Spring 6, which emanates from the Aberdeen tongue below the coal seams and surfaces in Dugout Canyon, is not expected to be impacted according to the Operator because it is two miles away. The proximity of the spring to the mined area only has a bearing on impact through time of impacts to reach the spring based on hydraulic conductivity, unless the spring is outside the hydrogeologic basin. If this spring issues from a fracture or bedding plane the potential for impact is higher. The spring's characteristics and hydrogeologic basin may support the Operator's position that this spring would not be impacted. However, that information is not presented. If the spring's recharge area includes the mined area the spring could be impacted by water quality and quantity with a likely increase in flow and TDS as a function of in mine sumps and mining operations. The Operator should discuss the area of recharge to this spring using hydrogeologic structures from drill logs to support their conclusion of no impact.

Increased monthly sampling was recommended in the March 29, 1994 inspection for Well 6-1 but, was not conducted. This particular well monitors a 200 foot zone in the Sunnyside and Rock Canyon seams where mining has occurred. Well 6-1, was found to be dry at 475 feet on June 3, 1994. The Operator performed a second measurement on August 15, 1994, but was again unable to reach the bottom of the well with the water level sounder. Mud, present on the wire and weight, indicate a well failure. The locking cap/cover is missing from the well and therefore no longer meets the administrative rules for water well drillers. Use of a water well must comply with the provisions of the division of water rights rules for water wells. This well is no longer properly maintained. The Operator should, either properly redevelop the well, or follow the requirements for well closure as required by R645-301-731.215. Redevelopment of this well could provide information during the post reclamation phase to determine recharge to the aquifer.

The Operator is pursuing water quality baseline monitoring on the Alkali lease area. The Operator now only has two wells in the mined vicinity: however, no wells are proposed for the new Alkali lease area. There is concern the Operator may not have adequate ground water information for the new lease area with the two existing monitoring wells. The Operator should analyze

available drill logs for the proposed lease area as, an analysis of the drill logs and assess whether additional wells are necessary to describe the ground water for the proposed LOM area.

On pg. 7-35 the Operator indicates no conclusive argument is available for explaining the water level fluctuations identified in wells 5-1, 32-1, and 6-1, and 10-2. Three potential reasons were sighted. First, the potential of variation due to recharge response. Second, the potential of variation due to the interbedded nature of the formation. Third, the wells have not reached equilibrium condition due to hydraulic testing method. However, the Operator has not discussed the relationship of the wells to the fracture and mining activities.

Information provided by Dave Spillman through phone conversations indicates the Operator provided a polyurethane grout from the Sunnyside seam down to the Blackhawk seam where the fracture was originally intercepted. The purpose in sealing the fracture was to seal off methane to allow the Operator to retrieve the coal reserves. In May through June of 1991 the Operator used an estimated 43 thousand lbs of grout in the fracture of the main first east of the Sunnyside seam. In December through January of 1991 in the main north another 43 thousand lbs of grout was used to seal the fracture. The fracture is assumed to be a strike slip according to Dave Spillman as no vertical displacement is evident.

It is interesting to note that the increasing water elevation in well 32-1, leveled off during the grouting period and then continued to increase. This well is located below the seam to be mined and may be connected to mine-water sources through the fracture. Should the well elevation begin to level off at the elevation of the in-mine sumps the hypothesis that there is a connection to mining would be supported.

The Operator should include a discussion in the monitoring plan for Well 6-1. The Operator's present plan indicates drill hole 6-1 is expected to remain as a viable water monitoring point beyond the originally proposed 1993 longwall extraction page 7-190, revised 6/1/93. The Operator commits to a reassessment of well monitoring sites in conjunction with the re-evaluation of the long term mine plan. The Operator should meet this commitment as a part of this review. A summary analysis of all data should be preformed for well 6-1.

The Operator has provided Figure 7.31-9 for well 6-1. The scale used to present the information is inadequate. The Operator should present a scale in feet rather than thousands of feet. The Operator shows additional well

information on Figure 7.24.7. The label incorrectly describes the information presented. The Operator provides the depth to water from the well casings not the water level elevation. Because the elevations have no relative base elevation, the presentation of data is misleading.

On page 7-82 the Operator states the regional aquifer in the Blackhawk is low yielding. However, this does not describe the site specific hydrology of the area. From the available water quality data the local hydrology of the Flagstaff and North horn do not appear to have better water-holding characteristics. The Operator should update this section to provide a accurate description of the local or site specific hydrology. (The actual yield from the mined area should be presented).

731.220. Surface Water Monitoring.

- 1. Include analysis for surface water quality according to use in an extended annual parameter list or, demonstrate that the potential for those contaminants do not exist from mining activities.*

Table 7.24-7, page 7-20 includes selected Utah Division of Health numerical standards.

The Operator provided a 5 year extended parameter list in Table 7.31-3. A commitment to complete this list in the quarter prior to the 5 year renewal due date is found in Section 7.31.2.2, page 7-136 revised 6/1/93.

The Operator is considered to have addressed this deficiency. Additional monitoring may be required as conditions change at the site.

- 2. Since the Operator does not propose to monitor the sites G-3 and G-4. Provide a monitoring plan, or sufficient information that will demonstrate that surface flow is not intercepted by the fracture and is separate from in-mine water flows.*

Currently approved surface water monitoring points include G-1, G-2 and G-5. This was authorized in the February 4, 1987, Five Year Permit Approval. Sites G-1 and G-2 were included to replace site G-4. Site G-3 has never been monitored in conjunction with the Soldier Creek Canyon Mine (the site does provide baseline information). Pages 7-93 and 7-97 have been revised to clarify the surface water monitoring points. (September 8, 1993)

In Section 7.28, page 7-91, the Operator indicates the natural base flow of

Soldier Creek may be lessened by the interception of water in the Blackhawk. The Operator suggests sites G-1 and G-2, in the head water area, accommodate the expanded boundaries. It is reasonable to measure the sites located in these areas due to the prevailing direction of ground water movement and base flow contributions. In order to determine potential impacts it would be prudent to maintain sites above and below the region of the fracture zone or zones where the mine is receiving inflows below streams. Location of loss of baseline flow from subsidence or fracture losses would not be discernable with the current monitoring plan. The lower monitoring point may identify potential impacts in decreased base flow by adjusting for mine water discharge. However, it would require additional monitoring to locate the impacted section.

Significant inflows are occurring in the mine along the fracture. The fracture appears to lie under the Soldier Creek and Pine Creek streams. The Operator indicates there is no evidence the fracture extends significantly beyond (above) the Blackhawk formation. However, the fracture may have created a zone of jointing associated with the fracture creating a significant recharge zone or section of losing stream. The Operator refers to Section 7.31.2 for contingency monitoring of stream losses. The only contingency monitoring found in this section is related to inflows greater than 50 GPM. The plan at that time is to notify the Division to develop a plan. However, this plan does not cover changes in flow due to stream losses as a result of a drain on the system; i.e., the ground water voids never fill therefore the stream is constantly a losing stream where as it may have fluctuated seasonally as gaining reach previously. Stream losses spread over a larger area (not direct interception) would not be identified by the proposed method.

The Operator states efforts will be made to sample sites G-1, and G-2 prior to sampling G-5. "Where possible, attempts will be made to sample the surface water stations on the same day", Table 7.31-1. Previous data was seldom sampled on the same day and therefore it would be difficult to make any statement to changes that may have occurred to date.

R645-301-731.300 Acid and Toxic Forming Materials

- 1. Information on identification and permanent disposal of acid and toxic forming waste is in the MRP but is scattered and not concise.*
- 2. Plans for protecting hydrologic resources from acid and toxic drainage from the temporary storage site are not clear and concise.*

Section 7.31.3 the Operator merely repeats the regulatory requirements but does not provide the site specific information required by R645-301-731. Location of references to specifics, such as, but not limited to sediment pond waste removal, should be listed in this section. Drainage around the temporary storage site was not presented by the Applicant.

REMAINING DEFICIENCIES and REQUIREMENTS

Proposals such as the waste rock site, coal washing facilities and longwall mining are no longer being pursued by the Operator within the scope of the 5 year plan. Information in the plan is therefore not representative of existing site conditions and is not current and concise information as required by R645-301-121. The Operator has not received approval for many of the proposed activities at this time. The Operator should remove all "proposed" operations that will not be pursued within this or the upcoming permit term. Additionally, a permanent wasterock site, currently approved according to the R645 requirements, should be provided by the Operator until approval of the proposed waste rock site is granted.

The following were determined incomplete responses to D.O. 92-A:

1. A permanent wasterock site, currently approved according to the R645 requirements, should be provided by the Operator until approval of the proposed waste rock site is granted.
2. Table 7.24-2 page 7-8 does not reflect Sunoco as owner of water right title 91-203. The Operator has since changed owners and the proper water right owner should now be identified. The Operator did not meet the requirements of D.O. 92-A #3, as required by R645-300-143. The Operator has not met the requirements of R645-301-724.100. (See January 8, 1992 letter from the Division of Water Rights.)
3. The Operator did not meet the requirements of D.O. 92-A #4, as required by R645-300-143. The Operator has not met the requirements of R645-301-724.100. Soldier Creek Coal Company must provide a commitment in the Mining and Reclamation Plan to coordinate with the Division of Water Rights immediately upon the determination that a water source has been impacted by mining operations. (See January 8, 1992 letter from the Division of Water Rights.)
4. The following are inadequate response to the requirements of Condition 6.
 - a) The Operator must include a map survey showing the potential recharge areas in the permit. Fracture zones identified in the mining process

should be identified and referenced as potential recharge zones as required by R645-301-724.600, Survey of Renewable Resource Lands.

- b) The LOM area when used should be used consistently throughout the plan; see pages 7-25 and 7-34. Provide consistent representative information for the estimated groundwater storage and recharge in LOM area and hydrogeologic basins.
 - c) The monitoring "assessment", to take place throughout the year during the mining process, was not described as to the degree of the assessment; i.e., what parameters will be monitored/described this proposal does not meet the requirements of R645-301-731.210 and R645-301-730.
 - d) The following potential hydrologic impacts are not assessed through the existing in-mine monitoring plan and therefore the Operator does not meet the requirements of R645-301-731.211.
 - i. The interception of perched aquifers which issue as a spring would not be monitored through the proposed in-mine monitoring schedule. The proposed annual inventory potentially misses "unusual" in-flows if an area is closed prior to completing the inventory. A qualitative analysis to identify the source characteristic of the intercepted aquifer would be unavailable.
 - ii. The Operator has not described how the proposed annual sampling plan is adequate to determine seasonal variations in-flow thus potential impacts on the hydrologic balance, including variations due to recharge functions.
 - iii. The Operator has not demonstrated that flows of 50 GPM will adequately monitor for all potential impacts as required under R645-301-731.210. The Operator has not described how the proposal will meet the quality and quantity and frequency sampling requirements. The Operator should commit to a minimum time period in which to notify the Division and other agencies of these high magnitude inflows.
5. The Operator does not have a series of wells to describe the aquifer below the lowest seam to be mined. However, Spring 6 emanates from the Aberdeen tongue below the coal seams in Dugout Canyon and may describe this system. The Operator should discuss the area of recharge to this Spring 6 using site

specific information as required by R645-301-731 and R645-301-731.211. Hydrogeologic structures from drill logs, and/or relative location and flow direction may support the conclusion that this spring will not be impacted.

6. The Operator should either properly redevelop the Well 6-1 or follow the requirements for well closure as required by R645-301-731.215. Redevelopment is required for the Operator to maintain this well as is proposed in the current mine plan. This well could provide important information through bond release to determine flooding of the mine workings.
7. The Operator has provided Figure 7.31-9 for Well 6-1. The scale used to present the information is inadequate. The Operator should present a scale in feet rather than thousands of feet to provide a clear figure per R645-301-121.
8. The figure heading, in Figure 7.24.7, incorrectly describes the information presented. The Operator provides the depth to water from the well casings not the water level elevation as indicated. Because the elevations have no relative base elevation the presentation of data is unclear. The Operator has not met the requirements of R645-301-121.

Additional Requirements:

- 1) The Operator's present plan indicates drill hole 6-1 is expected to remain as a viable water monitoring point beyond the originally proposed 1993 longwall extraction. The Operator committed to reassessing well monitoring sites in conjunction with the re-evaluation of the long-term mine plan. The Operator is not conducting the operations according to the approved permit R645-300.142. Therefore, reassessment should be completed at this time.
- 2) Information in the plan is not current and concise information as required by R645-301-121. According to discussion with the Operator, proposed waste rock site, longwall mining, and processing plant operations identified in the current plan will not be pursued within the upcoming permit term. The Operator should update the plan to identify the proposed dates of the Fan Portal Area, the waste rock site and the preparation plant construction per R645-301-526.113. The Operator should update the proposed mine sequence and timing due to the change in the proposed longwall mining operations.



State of Utah
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August 19, 1994

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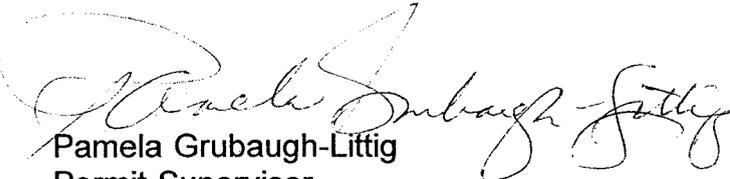
Re: Midterm Review, Soldier Creek Coal Company, Soldier Creek Mine,
ACT/007/018-94B, Folder #3, Carbon County, Utah

Dear Mr. Olsen:

The Division is commencing the midterm review for the Soldier Creek Mine. This midterm will include a review of the permit stipulations, reclamation cost estimate, the #3 fan, and the exploration wells. The anticipated date for completion of this review is September 22, 1994. At that time, the Division will notify you of the midterm review findings.

If you have any questions, please call me.

Sincerely,


Pamela Grubaugh-Littig
Permit Supervisor

cc: Daron Haddock

