File: ACT/007/016
#3
1 copy of plans to be inserted into MRP's as approved amendments

0013

Beaver Creek Coal Company
P.O. Box 1378
Price, Utah 84501
Telephone 801 637-5050

September 25, 1985

RECEIVED
SEP 30 1985
DIVISION OF OIL
GAS & MINING

Mr. D. Wayne Hedberg
Permit Supervisor
Utah Division of Oil, Gas, & Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

RE: Additional copies
Sweet's Canyon Water Fill-up Area
Gordon Creek No. 2 Mine
ACT/007/016, #3 & #4
Carbon County, Utah

Dear Mr. Hedberg:

Enclosed are 13 additional copies of the Sweet's Canyon Water Fill-up Area M.R.P. Amendment, as required. The maps and pages are numbered for direct insertion into the approved M.R.P.

If you need any further information, please let me know.

Respectfully,

Dan W. Guy

Dan W. Guy,
Manager of Permitting and Compliance

DWG/sb

Enclosures

cc: File 4-P-5-6-2
IBM D3

AMENDMENT TO
APPROVED Mining & Reclamation Plan
Approved, Division of Oil, Gas & Mining
by D.W. Hedberg date June 24/85
D. Hooper
reviewer

LIST OF PLATES

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Plate Number	Title
3-1	Surface Facilities Map with Topography
3-1a	Sweet's Canyon Pond (As Built)
3-1a(1)	Sweet's Canyon Pond (Proposed Plan)
3-1a(2)	Sweet's Canyon Pond (Proposed X-Section)
3-1b	Old Fan Portal Area
3-2	Transportation Facilities Plan and Profiles
3-2a	Transportation Facilities - Cross Sections
3-3	Mine Development Plan - Castlegate "A" Seam
3-4	Mine Development Plan - Hiawatha Seam
3-5	Mine Operations Map - Castlegate "A" Seam
3-6	Subsidence Monitoring Map
3-7	Post-Mining Topography
3-8	Existing and Future Cross Sections
5-1	Archaelogy Survey Area
6-1	Geologic Map of the Gordon Creek No. 2 Mine and Adjacent Area
6-2	N-S Geologic Cross Section
6-3	W-E Geologic Cross Section
6-4	Isopach Map of the Hiawatha Seam

AMENDMENT TO
APPROVED Mining & Reclamation Plan
Approved, Division of Oil, Gas & Mining
by DW Hedberg date 24 June 85
reviewer xx D. Hooper

7.2.2.2 Mine Plan Area Surface Water Hydrology (continued)

Water quality data from sample locations are provided in Table 7-2. As discussed in Section 7.1.3, surface water quality does not appear to be significantly different from ground water quality.

According to Appendix B, Wastewater Disposal Regulations Part II, Standards of Qualtity for Waters of the State (of Utah), The Price River and its tributaries from the confluence with Green River to Castle Gate, are classified 3C and 4. This reach includes the North Fork Gordon Creek (Sweets Canyon), but not Beaver Creek. Class 3C means that the particular stream is protected for non-game fish and other aquatic life, and Class 4 means that the stream is protected for agricultural uses. Table 7-3a lists numerical standards for both of these classes.

Beaver Creek is included in the classifications for the Price River and tributaries from Castle Gate to it's headwaters. These are 1C (Protected for domestic use with prior treatment), 3A (Protected for cold water fisheries) and 4 (Agricultural). Table 7-3b lists numerical standards for classes 1C and 3A.

7.2.3 Surface Water Development, Control and Diversions

7.2.3.1 Water Supply (Surface)

Water for use underground is pumped out of Sweets Canyon Creek from a pumping station below the mine. Water rights were obtained from Sweet Coal Company (See Appendix 2). The system was reconstructed in 1985. The hydrologic design data is provided on the following sheets.

7.2.3.1 Water Supply (Surface) (continued)

Sweet's Canyon Hydrologic Design

The design flow estimates were developed using the SCS program TR-20. Flow estimates ae developed for both Bryner Canyon and the North Fork of Gordon Creek above the confluence with Bryner Canyon. Flows from Bryner Canyon are developed using the estimates obtained from 2 & 7 mine disturbed area drainage calculations. Revised flow estimates developed using the Type II rainfall distribution are provided in Table 1. Flow estimates are also developed for the Right Fork of Bryner Canyon for drainage from the access road and Area C representing all other areas draining to Bryner Canyon below the No. 2 mine site. These estimates are provided in Table II and were developed using the Type II rainfall distribution.

Temporary Diversion, North Fork of Gordon Creek

A diversion channel is designed to keep flows in the North Fork Gordon Creek separate from water in the truck fill-up pond. A berm separates the diversion channel from the pond as shown in the attached exhibit. The exisiting channel slopes were surveyed in order to develop the diversion designs.

Based on the sestimated life of the structure of 5 to 10 years, the channel was designed for a flow of 155 cfs, the peak flow from a 25-yr., 24-hr. precipitation event. The channel upstream of the diversion just above the pumphouse headgate enters with a slope of 0.028. From the pumphouse headgate to the drop structure, the slope is 0.0033. The slope of the drop structure is 0.28 while the bedslope of the natural channel below is about 0.03.

TABLE 7-3c - INPUT SPECIFICATIONS AND RESULTS OF TR-20 FLOW ESTIMATES
NO. 2 & 7 MINE DISTURBED AREAS

				Sub Drainages				
	Area B	No. 7 Site	Combined	Sub-1	Sub-2	Combined	Sub-3	Total Combined
Area - Acres	204	7.7	211.7	1.54	6.4	219.6	25.6	244.2
Curve Number	63	86		86	89	--	63	--
Slope Length (feet)	4500 ft.	1650 ft.	--	480 ft.	900 ft.	--	1500 ft.	--
Slope (%)	23%	16%	--	6%	4%	--	37%	--
Lag (hrs.)	0.36 hrs.	0.12 hrs.	--	0.06 hrs.	0.11 hrs.	--	0.14 hrs.	--
Time of Concentration (hrs.)	0.6 hrs.	0.20 hrs.	--	0.1 hrs.	0.18 hrs.	--	0.23 hrs.	--
10-yr., 24-hr. Precipitation Results								
Precipitation (in)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Peak Discharge (cfs)	4.0	6.2	6.5	1.4	6.3	13.6	0.6	13.7
Total Runoff (acre-feet)	1.73	0.54	2.27	0.11	0.55	2.93	0.22	3.15
25-yr., 24-hr. Precipitation Results								
Precipitation (in)	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Peak Discharge (cfs)	24.6	10.2	27.2	2.3	9.9	30.8	5.4	36.0
Total Runoff (acre feet)	5.36	0.9	6.26	0.18	0.87	7.31	0.67	7.97

TABLE 7-3d - INPUT SPECIFICATIONS AND RESULTS OF TR-20 FLOW ESTIMATES

SWEETS CANYON WATER TRUCK FILL-UP

		Sub Drainages				
	2 & 7 Mine Disturbed Area (Total combined from Table 1	Right Fork Bryner Canyon	Access Road To 2 Mine	Area C	Combined Bryner Canyon	North Fork Gordon Creek
Area - Acres	244.2	203	22	148	617	3,620
Curve Number	--	63	84	63	--	63
Slope Length (feet)	--	4300	150	5600	--	26,900
Slope (%)	--	26	35	20	--	10
Lag (hrs.)	--	0.36	0.06	0.45	--	2.1
Time of Concentration (hrs.)	--	0.60	0.1	0.75	--	3.5
10-yr., 24-hr. Precipitation Results						
Precipitation (in)	2.0	2.0	2.0	2.0	2.0	2.0
Peak Discharge (cfs)	13.8	3.9	20.2	2.7	28.7	39.0
25-yr., 24-hr. Precipitation Results						
Precipitation (in)	2.7	2.7	2.7	2.7	2.7	2.7
Peak Discharge (cfs)	35.6	24.5	33.3	15.8	77.6	155
50-yr., 24-hr. Precipitation Results						
Precipitation (in)	2.9	2.9	2.9	2.9	2.9	2.9
Peak Discharge (cfs)	46.0	33.1	37.2	21.5	103.3	201

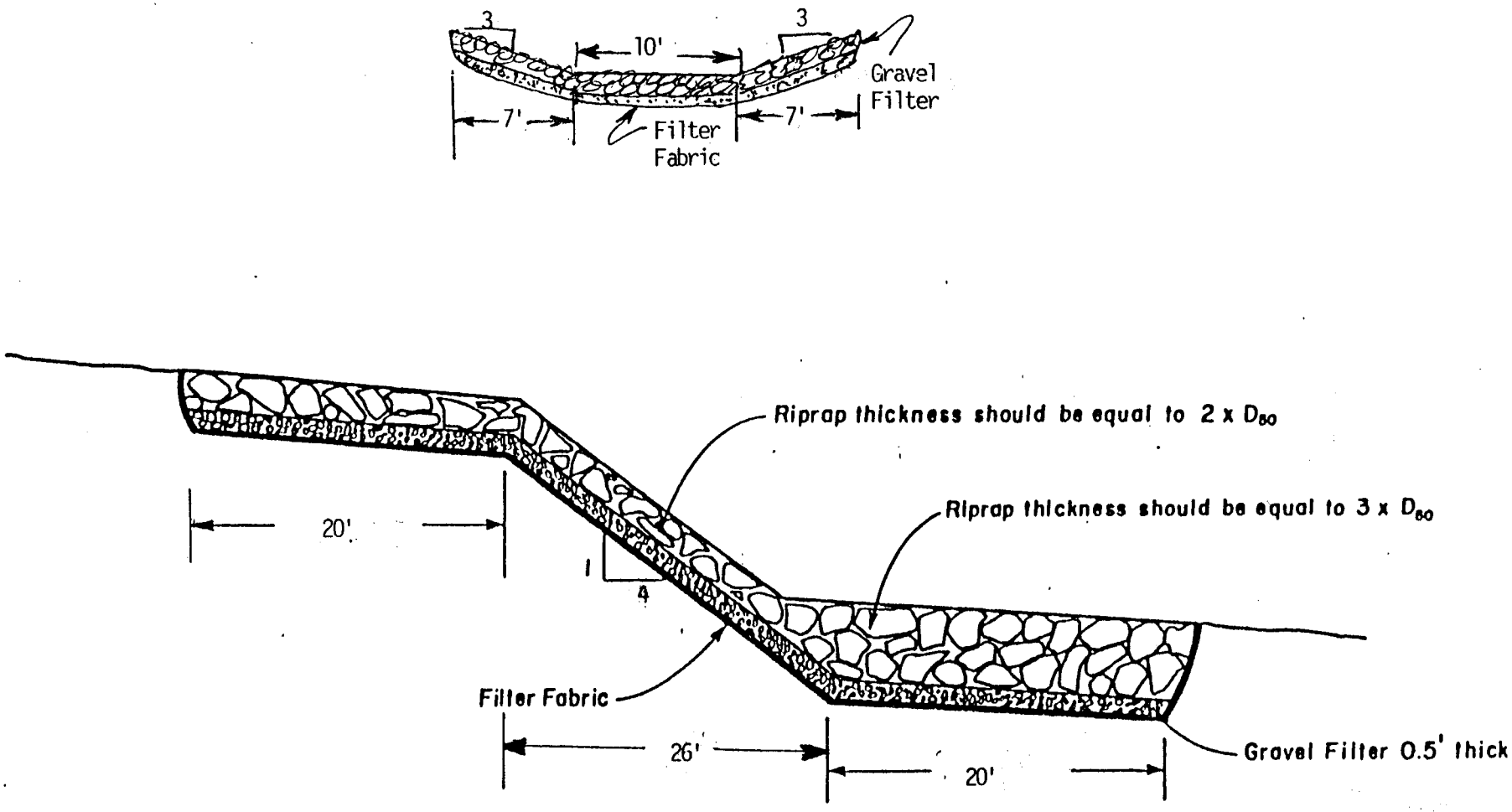

Figure 7-5a design of riprap drop structures.

7.2.3.1 Water Supply (Surface) (continued)

A trapezoidal channel is designed for the diversion above the dropstructure using Manning's Equation. Design specifications are provided below for the discharge from a 25-yr., 24-hr. precipitation event:

Discharge	=	155
Slope	=	0.0033
Velocity (ft/sec)	=	4.07
Normal Depth (ft)	=	2.1
Bottom Width (ft)	=	15
Side Slope	=	1.5:1
Manning's n	=	0.03

A rip rapped drop structure is designed according to the specifications in Figure 1. Design specifications for a trapezoidal shaped section are provided below for the discharge from a 25-yr., 24-hr. precipitation event:

Discharge	=	155
Slope	=	0.28
Velocity (ft/sec)	=	15.1
Normal Depth (ft)	=	0.82
Bottom Width (ft)	=	10
Side Slope	=	3:1
Manning's n	=	0.04

RIP RAP SIZING

Rip rap is sized to provide channel protection for flows up to 39 cfs representing the peak discharge from a 10-yr., 24-hr. precipitation event. The slope of the drop structure is 0.28. For a trapezoidal channel with a 10 ft. bottom width, 3"1 side slopes and a roughness coefficient of 0.04, the estimated normal depth is 0.37

7.2.3.1 Water Supply (Surface) (continued)

ft. Angular rock rip rap with a median diameter of 1.25 to 1.5 ft is sued for channel protection. The safety factor is estimated using the following equation from Simons and Senturk (1977):

$$SF = \cos\theta \tan\phi \,.\, (n' \tan\phi + \sin\theta \cos B)$$

where:

ϕ the angle of repose is 42°
θ the side slope angle is 18.4
$B = \tan^{-1} (n \tan\phi / \sin\theta) = 66.38$
$n = 21\ T_s/(w_s - w)\ D_{50} = 0.8$
ws the specific wt. of water is 62.4 lbs/ft^3
D_{50} is the median rock diameter = 1.25 ft.
T_s the maximum tractive force = 0.77 wds = 4.978 lbs/ft^3
d is the depth of flow = 0.28
$n' = (n/2)\ (1 + \sin B) = 0.768$

Thus, for D_{50} equal to 1.25 ft. the safety factor is:
SF = COS 18.4 TAN 42/(0.768 TAN 42 + SIN 18.4 COS 62.3)
= 1.04 ft. For D_{50} equal 1.5 + the safety factor is 1.2

Therefore, a median rip rap diamter of 1.25 to 1.5 ft. should provide adequate channel protection for peak discharges from events in excess fo the 10-yr., 24-hr. precipitation event.

Byrner Canyon - Diversion

Bryner Canyon will be diverted around the water truck fill-up pond by routing flows across the main access road through a culvert, down a road side diversion ditch for about 115 ft. and back across the road through a culvert.

Bryner Canyon - Diversion (continued)

The culverts and diversion ditch are sized for a peak discharge from a 10-yr., 24-hr. precipitation event.

Both road culverts are 36-inch corregated metal pipe with mitered entrance equipped with trash racks. The culverts can accommodate flows up to 35 cfs without head water depth exceeding the culvert diameter. Thus, the culverts will safely pass the 29 cfs flow from a 10-yr., 24-hr. percipitation event. Headwater depths would reach about 2.5 times the culvert diameter during a flow of 78 cfs which correspondence with the peak discharge from a 25-yr., 24-hr. precipitation event.

The diversion ditch is a trapozoidal channel designed using Manning's Equation. Design specifications are provided below to the discharge from a 10-yr, 24-hr. precipitation event:

Discharge (cfs)	=	29
Slope	=	0.045
Velocity (ft/sec)	=	6.2 ft.
Normal depth (ft)	=	0.9 ft.
Bottom width	=	3.0
Side Slope	=	25:1
Manning's n	=	0.036

This diversion channel is protected with rip rap with a median diameter of 7 inches. Rip rap was sized using the procedures from "Erosion and Sediment Control; Surface Mining in the Easter U.S." (EPA - 625/3-76-006) as developed in Figure 2.

A rip rapped apron is provided at the outlet of the culverts.

Bryner Canyon - Diversion (continued)

A channel is provided to bring flows back to the old Bryner Canyon stream channel at non-erosive velocities. The channel is a trapozoidal channel with design specifications developed below for the discharge from a 10-yr., 24-hr. precipitation event:

Design Discharge (cfs)	=	29
Slope	=	0.033
Velocity (ft/sec)	=	4.9
Normal depth (ft)	=	0.52
Bottom width (ft)	=	10.0
Side Slope	=	2.5:1
Bed Slope	=	0.033
Manning's n	=	0.033