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**U. S. Steel
Mining Co., Inc.**

a Subsidiary of United States Steel Corporation

P.O. BOX AE
PAONIA, COLORADO 81428
303/527-4816

July 11, 1984

file #7

RECEIVED

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DIVISION OF OIL
GAS & MINING

WESTERN DISTRICT

State of Utah
Department of Natural Resources
Division of Oil, Gas & Mining
4241 State Office Building
Salt Lake City, Utah 84114

ACT/007/012
#7

Attn: Wayne Hedberg

Re: NOV N84-2-12-1
Wellington Coal Cleaning Plant
ACT/007/012

Dear Mr. Hedberg:

Approved plans for the permanent diversion ditch provided that riprap be installed at certain locations as shown on Map E9-3427. U.S. Steel Mining Co.'s contractor obtained riprap which contained a higher percentage of fine material than was specified. Cement grout was used to stabilize the smaller sized material while still leaving the larger sized material exposed to control velocities.

Riprap was installed as follows (refer to Map E9-3427-Technical Revision No. 1):

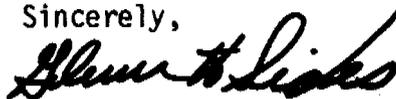
<u>Location</u>	<u>Description</u>
0 + 00 to 1 + 30	Grouted riprap on one side of channel similar to Section A-A Map E9-3427
2 + 00 to 2 + 18	Grouted riprap weir on both sides and bottom of channel - similar to Section B-B Map E9-3427
10 + 60	Grouted riprap weir (12 ft. long) where the permanent diversion ditch intersects the Siaperas Ditch.
West Side of Diversion	Riprap was installed on the west side of the diversion ditch to control surface run off erosion of the ditch bank.
East Side of Diversion	Riprap was installed on the east side of the diversion ditch (except for curve at section D-D) to control surface run off erosion of ditch banks.

Note: All riprap used was - 6 inch + 1½ inch clean rock.

The permanent diversion ditch is designed to divert flow in two ephemeral drainages east of the Upper Refuse Pond. (Reach 1 and Reach 2). The hydrograph calculations in Technical Revision No. 1 (Appendix B) show that the peak flow for a 100 year, 24 hour storm is 53.12 cfs (copy attached). The attached calculation sheet shows that the peak velocity in the diversion would be 4.6 ft/sec., which is less than 5 ft. per sec. (non-erosive). Therefore, no riprap is required. Since the riprap has been installed over and above any clear requirement for riprap, the channel should be stable during permanent reclamation, even with a complete breakdown of the cement grout, without any further modifications.

The Operator proposed installing riprap to minimize or eliminate any future need for stream channel maintenance. The riprap was grouted to stabilize any material smaller than the 4 inches submitted to the Division in Technical Revision No. 1.

Sincerely,



Glenn H. Sides
General Superintendent

w1

cc: Sandy Pruitt-DOGM
B. A. Filas
L. King
V. R. Watts
E C File

CALCULATION NOTES

Subject UNIT HYDROGRAPH ANALYSIS

By M.O.A

SUMMATION OF ORDINATES

Checked _____

GAH 1+2- Upper Refuse Pond

Acc't _____

STORM DURATION: 24 HOURS

4-25-1983

Sheet No. 21 of 22 Sheets

TIME INCREM. HRS	ORDINATES OF UNIT HYDROGRAPH CES	10-24	25-24	100-24	TIME INCREMENT HOURS	ORDINATES OF UNIT HYDROGRAPH CES	10-24	25-24	100-24
Q →	1"				Q =	1"			
0		0	0	0	60		0.152	0.203	0.345
2		1.27	1.78	2.97	62		0.11	0.16	0.26
4		4.17	5.85	9.72	64		0.07	0.10	0.17
6		8.29	11.63	19.32	66		0.05	0.06	0.11
8		14.17	19.89	33.03	68		0.02	0.03	0.05
10		19.30	27.08	44.98	70		0	0	0
12		22.34	31.31	52.01					
14		22.82	31.97	53.12	CFS HRS.		421.639	590.355	980.924
16		22.04	30.85	51.26	AG. FT.		34.844	48.787	81.063
18		19.59	27.42	45.56					
20		16.78	23.46	39.00					
22		13.08	18.28	30.39					
24		9.78	13.67	22.74					
26		7.80	10.90	18.10					
28		6.18	8.64	14.36					
30		4.89	6.83	11.36					
32		3.91	5.47	9.09					
34		3.08	4.30	7.16					
36		2.42	3.38	5.62					
38		1.92	2.68	4.46					
40		1.52	2.12	4.31					
42		1.18	1.66	2.76					
44		0.95	1.33	2.21					
46		0.72	1.00	1.66					
48		0.61	0.84	1.39					
50		0.48	0.67	1.11					
52		0.37	0.51	0.85					
54		0.29	0.40	0.67					
56		0.23	0.31	0.52					
58		0.183	0.26	0.42					

CALCULATION NOTES

By B. A. Fikes

Checked VRW

Acc't _____

July 6 1984

Sheet No. 1 of _____ Sheets

Subject _____

Wellington Coal Cleaning Plant

Permanent Diversion Ditch

Reach 1 & 2 - Refuse Area

Riprap Calculations

Reach 1+2 Peak Flow = 53.12 cfs (ref. Technical Revision No 1
Appendix A) - See Attached Sheet

Channel Dimensions:



Manning Equation: $Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$

Where: A = Area

R = Hydraulic Radius

S = Slope = 0.008

n = Roughness Factor = 0.025

$$A = 10d + 1.5d^2$$

$$R = \frac{A}{10 + 2\sqrt{(1.5d)^2 + d^2}}$$

$$Q = \frac{1.486}{0.025} (10d + 1.5d^2) \left(\frac{10d + 1.5d^2}{10 + 2\sqrt{(1.5d)^2 + d^2}} \right)^{2/3} 0.008^{1/2}$$

At $Q = 53.12$ cfs $d = 0.9834 \Rightarrow$ use $d = 1.0$ ft maximum depth

$$V = \frac{Q}{A} = \frac{53.12}{10d + 1.5d^2} = \frac{53.12}{10(1) + 1.5(1)^2} = 4.62 \text{ ft/sec } (< 5 \text{ ft. per sec.})$$

Velocity is non-erosive