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TO: File

FROM: Paul Baker, Reclamation Biologist PBB

DATE: December 7, 1992

RE: Erosion at Goose Island, AMAX Coal Co., Castle Gate Mine, Folder #2, ACT/007/004, Carbon County, Utah

On December 1, 1992, Mickey Steward of AMAX and I evaluated the erosion on a portion of the Goose Island refuse pile in Hardscrabble Canyon according to an erosion classification system developed by the Bureau of Land Management and modified by Mark Humphrey of OSM.

Part of the revegetated refuse pile was covered with snow. We chose an area of about 3000 square feet that had little snow cover. It was located above the break in the slope that leads to the channel on a south-facing slope of approximately 4h:1v. (The slope and amount of area that we evaluated were not measured.)

I introduced Mickey to the system by discussing it with her as we did the evaluation on an undisturbed area near the Castle Gate Preparation Plant. The ratings that we did at Goose Island were independent of each other; we didn't discuss them at all until we were done.

I obtained a value of 57 for the site, and Mickey got 54. A copy of my evaluation sheet is attached. The area had quite a bit of fairly substantial pedestalling and some rock pavement. There were also quite a few microterraces showing signs of soil movement. There were only a few rills, and there were no gullies. Although rills were not common, they averaged about 3 inches deep. It was difficult to determine how much of the soil movement was recent. It will be important that the area be reevaluated periodically to show any trends.

Because the Division is looking at this classification system for its usefulness in evaluating erosion, I felt that Ms. Steward's comments and reactions were important. Although she had not had time to thoroughly study the method or to use it prior to our meeting, she seemed to be favorably impressed. In particular, she saw that even though the system is somewhat qualitative, the results were consistent. I also discussed with her the concept that areas that have critical or severe erosion would not be considered suitable for any land use. My understanding of the reasoning for this concept is that the vegetation on an area that has severe or critical erosion should be allowed to recover from herbivory (the land use) to enhance erosion control capabilities. I felt that she understood and seemed to agree with this reasoning.

OFFICE OF SURFACE MINING RECLAMATION AND ENFORCEMENT
DETERMINATION OF EROSION CONDITION
SOIL SURFACE FACTOR (SSF)

OBSERVER: Paul Baker DATE: 12/1/92 MINE: Castle Gate

LOCATION: South-Facing slope at Goose Island

DESCRIPTIONS OF DIFFERENT DEGREES EACH OF THE EROSION FACTORS

EROSION FACTORS						TOTALS OBSERVED/POTENTIAL
SOIL MOVEMENT	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is between 0 and .1 in. (0 to 2.5 mm).	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated area, is between .1 and .2 in. (2. to 5 mm).	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is between .2 and .4 in. (5 to 10 mm).	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is between .4 and .8 in. (10 to 20 mm).	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas is over .8 in. (20 mm).	
	0 or 1 2 3	4 5 6	7 8 9	10 11 12	13 14	12
SURFACE & LITTER MULCH	No movement, or if present, less than 2 percent of the litter has been translocated and redeposited against obstacles.	Between 2 and 10 percent of the litter has been translocated and redeposited against obstacles.	Between 10 and 25 percent of the litter has been translocated and redeposited against obstacles.	Between 25 and 50 percent of the litter has been translocated and redeposited against obstacles or removed from that area.	More than 50 percent of the litter has been translocated and redeposited against obstacles or removed from the area.	
	0 or 1 2 3	4 5 6	7 8 9	10 11 12	13 14	4
SURFACE ROCK FRAGMENT	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is less than .1 in. (2.5 mm).	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is between .1 and .2 in. (2.5 to 5 mm).	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is between .2 and .4 in. (5 to 10 mm).	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments, is between .4 and .8 in. (10 to 20 mm).	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is over .8 in. (20 mm)	
	0 or 1 2 3	4 5 6	7 8 9	10 11 12	13 14	7
PEDESTAL-LING	Pedestals are mostly less than .1 in. (2.5 mm) high and/or less frequent than 2 pedestals per 100 sq. ft.	Pedestals are mostly between .1 to .3 in. (2.5 to 8 mm) high and/or have a frequency of 2 to 5 pedestals per 100 sq. ft.	Pedestals are mostly between .3 to .6 in. (8 to 15 mm) high, and/or have a frequency of 5 to 7 pedestals per 100 sq. ft.	Pedestals are mostly between .6 and 1 in. (15 to 25 mm) high, and/or have a frequency of 7 to 10 pedestals per 100 sq. ft.	Pedestals are mostly over 1 in. (25 mm) high, and/or have a frequency of over 10 pedestals per 100 sq. ft.	
	0 or 1 2 3	4 5 6	7 8 9	10 11 12	13 14	13
FLOW PATTERNS	None, or if present, less than 2 percent of the surface area shows evidence of recent trans - location and deposition of soil and litter.	Between 2 and 10 percent of the surface area shows evidence of recent translocation and deposition of soil and litter.	Between 10 and 25 percent of the surface area shows evidence of recent translocation and deposition of soil and litter.	Between 25 and 50 percent of the surface area shows evidence of recent translocation and deposition of soil and litter.	Over 50 percent of the surface area shows evidence of recent translocation and deposition of soil and litter.	
	0 or 1 2 3	4 5 6	7 8 9	10 11 12	13 14 15	12
RILLS	Rills, if present, are mostly less than .5 in. (13 mm) deep, and generally at infrequent intervals over 10 ft.	Rills are mostly .5 to 1 in. (13 to 25 mm) deep, and generally at infrequent intervals over 10 ft.	Rills are mostly 1 to 1.5 in. (25 to 38 mm) deep, and generally at 10 ft. intervals.	Rills are mostly 1.5 to 3 in. (38 to 76 mm) deep, and at intervals of 5 to 10 ft.	Rills are mostly 3 to 6 in. (76 to 152 mm) deep, and at intervals of less than 5 ft.	
	0 or 1 2 3	4 5 6	7 8 9	10 11 12	13 14	9
GULLIES	No gullies, or if present, less than 2 percent of the channel bed and walls show active erosion (are not vegetated), gullies make up less than 2 percent of the total area.	Between 2 and 5 percent of the channel-bed and walls show active erosion (are not vegetated), or gullies make up between 2 and 5 percent of the total area.	Between 5 and 10 percent of the channel bed and walls show active erosion (are not vegetated), or gullies make up between 5 and 10 percent of the total area.	Between 10 and 50 percent of the channel bed and walls show active erosion (are not vegetated), or gullies make up between 10 and 50 percent of the total area.	Over 50 percent of the channel bed and walls show active erosion (are not vegetated) along their length, or gullies make up over 50 percent of the total area.	
	0 or 1 2 3	4 5 6	7 8 9	10 11 12	13 14 15	0

57

TOTAL SSF 57 / 100 x

(Observed/Potential x100)

EROSION CONDITION CLASSES:
STABLE 0-20 SSF, SLIGHT 21-40 SSF, MODERATE 41-60 SSF, CRITICAL 61-80 SSF, SEVERE 81-100 SSF

SSF's DISRUPTIVE TO POSTMINING LAND USES: Cropland and Forestry 41-100 SSF, All Other Uses 61-100 SSF

POSTMINE LAND USE: _____