March 20, 2002

TO: Internal File

THRU: Daron R. Haddock, Permit Supervisor

FROM: Priscilla W. Burton, Sr. Reclamation Specialist/Soils

RE: Technical Field Visit, Topsoil Stockpile, Savage Industries Inc., Savage Coal Terminal, C/007/022

Other Attendees:

Dan Guy, Blackhawk Engineering
Boyd Rhodes, General Manager, Savage Industries Inc.

Date & Time:

March 19, 2002, from 10:15 am to 11:15 am

PURPOSE:

To observe progress on topsoil pile construction and roughening.

OBSERVATIONS:

Chipeta Silty Clay, Killpack Silt Loam, and Saltair Silty Clay Loam topsoil from the 13-acre coal storage enlargement (Plate 3-2 and Plate 8-1), has been placed between the topsoil and subsoil stockpiles on the southeastern border of the permit area. Projections were that 12,140 cu yds of topsoil might be salvaged (MRP page 8-39). Previously, the topsoil pile held approximately 13,000 cu yards and covered 1.2 acres (Appendix 8-1 Topsoil Stockpiles As Built Survey and Plate 8-2). The subsoil pile held approximately 36,000 cu yards and covered 1.4 acres (App 8-1). All totaled, that is 61,615 cu yds that is expected to be stored in the combined subsoil/topsoil stockpile for the disturbed area of 125.9 acres (Table 8-9).

Before this addition of topsoil, the subsoil pile was previously 36 feet high at its apex (Plate 8-2). (For descriptions of previous work on the topsoil and subsoil stockpiles, refer superceded MRP sections 3.2.4 and 3.5.2.) The subsoil and topsoil piles are being regraded to reduce the height and slope. It appeared that the subsoil pile had been reduced by at least ten feet

for most of its length.

Treatment of the piles to improve water infiltration was discussed. Mr. Boyd was prepared to rip the surface of the pile on the contour to create furrows around the pile. I encouraged the creation of microbasins with gouging as the best method for water retention. The basins should be created with a trackhoe to be 18 inches deep and about 24 inches wide. The basins should be randomly placed and very closely spaced. The Extreme Surface Roughening Technique Sheet describing gouging is attached (see The Practical Guide to Reclamation in Utah, p 106 available online at http://www.dogm.nr.state.ut.us).

Timing of seeding and gouging was discussed. Table 11-1 provides climate information from the Utah Climate Center for the Price Warehouses indicating that the period of favorable precipitation and snow accumulation begins in August and continues through April. Section 3.5.5.2 of the MRP indicates summer seeding to promote the establishment of warm season grasses. Seeding of the topsoil stockpile should also occur in late July of 2003, rather than now. This delay will also allow for incorporation into the pile of the riparian area soils currently flagged and undisturbed.

At the time of the field visit, I was asked whether hay or wood fiber mulch would be appropriate. I recommended wood fiber mulch based on the results of the Refuse Pile Test Plots #1 evaluated in 1997 (see 1997 Annual Report). However, Section 3.5.2 of the MRP indicates that 2,000 lbs/ac of hay mulch will be added to the surface of the stockpile before roughening and a wood fiber mulch will be applied after the seeding. The Permittee should follow the approved MRP Section 3.5.2 for treatment of the topsoil stockpile.

Approximately 2 million tons of coal is currently stored on site for four mines. The refuse storage area that was previously emptied by the re-mining activity of Sunnyside Cogeneration Associates is currently being used to store coal.

RECOMMENDATIONS/CONCLUSIONS:

Soils within the flagged area should also be included in the topsoil stockpile when the approval is received from the Army Corps to disturb the 0.05-acre site. The topsoil stockpile should receive 2,000 lbs/ac hay before being gouged and seeded in late July with the temporary reclamation seed mixture found in Table 3-1. An hydromulch application of wood fiber is also required by the plan.

An As-Built of the topsoil stockpile should provide current volume information on the stockpile to update Table 8-9 and Plate 8-2 of the MRP and a summary of procedures taken to vegetate the pile.

cc: Boyd Rhodes, Savage
Dan Guy, Blackhawk
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Extreme Surface Roughening

Extreme surface roughening, which is also known as pocking or gouging, is used to intercept and trap sediment on a microscale. Roughening also collects moisture, which improves vegetation establishment and consequently prevents erosion. Surface roughening is highly recommended for moderate to steep slopes (up to 1h:1½v) but is also useful for flat or gently sloping areas with erosive soils and arid climates. Extreme surface roughening is most practical for use on small disturbed areas of fewer than fifty acres or for critical portions of large disturbances, such as highly erosive soils and areas adjacent to streams. Discontinuous ripping on the contour can be used to roughen larger disturbed areas.

discontinuous ripping: *lifting ripper blades every ten to fifteen feet to prevent long water pathways.*

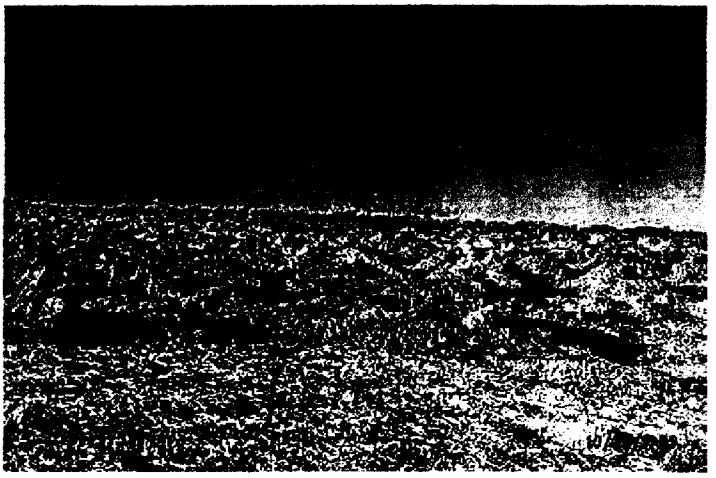

Figure 1.1: Straw is incorporated into the soil when roughening the soil surface. Crawford Mountains Phosphate Mines.

Basic Design and Construction

Use a backhoe or trackhoe shovel to create microbasins for extreme surface roughening. The trackhoe shovel is used to dig, poke, or push basins with a minimum depth of eighteen inches. These basins should be 1 ½ to 2 feet deep and have the width of the bucket. This allows the basins to be up to four feet wide. The most common construction method is to dig a bucket load of soil and then drop it 2 to 3 feet above the soil surface. Repeat this process in a random and overlapping pattern, making it impossible for water to flow down slope. Finished roughened soils should be difficult to walk over. On poor, shaley sites, such as the Mancos Shale, the pocks can fill with sediment within a short time period. Therefore, the pocks should be as large as possible on these soils. Conversely, on-sites with adhesive soils, the pocks should not be too large, because they would not fill in with sediment over time. Straw, alfalfa, or hay can be spread during roughening and anchored to the soil surface by jabbing the materials into the soil surface or tacking them with a hydromulch slurry.

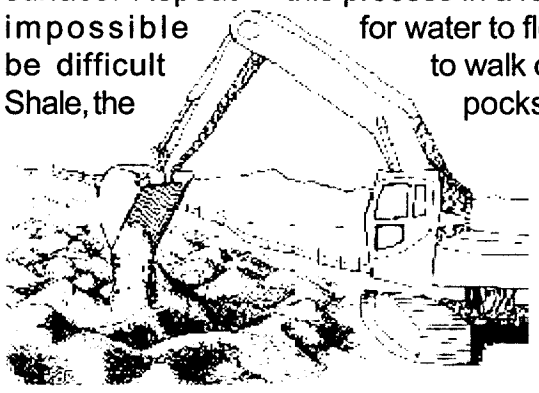

Figure 1.2: A trackhoe is used to create microbasins. Drawing by Jenny Suflita.

Because a drill seeder cannot be used on such rough surfaces, seed must be broadcast (Chapter 4, Section 2). In areas with extremely dry and loose soil, it may be advantageous to wait until the soil has settled before starting the seeding process. One method is to broadcast half the seed immediately and broadcast half the seed after the soil settles.

Ripping is used as a soil roughening technique in areas too large to economically roughen with a backhoe. Ripping breaks up compacted layers of soil. Seed can be simultaneously spread with the ripping operation if a broadcast seeder is attached to the ripping equipment. Soil amendments or surface mulch are incorporated into the soil during the ripping operation or anchored with non-surface disturbing methods such as tackifier or netting. Rip soils when they are dry to permit shattering beneath the surface.

Ripping guidelines:

- Rip to a depth of 2 to 3 feet.
- Make rips contour to the slope.
- The distance between rippers should be equal to the depth ripped.
- Lift the ripper from the soil every 10 to 20 feet to reduce long water pathways.

Problems may occur if:

- Basins are made when the soil is wet, causing hard, compacted soils to form in the depressions when dry.
- There is too much space between basins. Basins need to be overlapping.
- Basins are not large enough, which causes them to fill in prior to vegetation establishment.
- Basins are used as a permanent erosion control method when they are only temporary (2 to 3 years) in areas of low vegetation cover.
- Ripping resembles contour furrows, which can concentrate water and cause catastrophic breaching.