0008

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

Michael O. Leavitt
Governor
Kathleen Clarke
Executive Director
Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

March 11, 2002

TO: Internal File

THRU: Daron R. Haddock, Permit Supervisor

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

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

Other Attendees:

Joe Helfrich, DOGM Inspector
Boyd Rhodes, General Manager, Savage Industries Inc.

Date & Time:

March 6, 2002, from 10:00 am to 1:30 pm

PURPOSE:

To familiarize myself with the soils in the area to be disturbed by AM02A and evaluate the condition of the topsoil, subsoil, and vegetation test plot #2 installed in 1989.

OBSERVATIONS:

Test Plot #2 is located near Pond 6 and was installed in September 1989. Quantitative observations of test plot #2 (made by Patrick Collins of Mt. Nebo Scientific in 1997) were reviewed at the Price Field Office prior to arriving at the mine site. The disturbed soils were prepared as follows (MRP Chapter 9, App 9-2):

- The disturbed ground was scarified using a JD450 tractor crawler.
- A slurry of superphosphate was applied and incorporated to a depth of six inches.
- The site was hand broadcast (using twice the drill seed rate) and lightly hand raked.
- The area was hydromulched with 2,000 lbs/ac and Agro Tac at a rate of 100 lbs/ac.
- Urea fertilizer was sprayed over the area in early spring at a rate of 100 lbs/ac.

Test Plot #2 evaluated a single treatment that was incorporated of green alfalfa hay to a depth of six inches prior to seeding on the east half of the plot. (The MRP does not disclose the rate of green alfalfa hay application.) Our qualitative observations of the plots were in agreement with the work summarized in the 1997 Annual Report. That is, the east half (hay mulch treatment) of the test plots were covered more densely by vegetation than the west half (no hay mulch). Vegetation appeared to be growing in rows left by equipment.

The topsoil pile holds approximately 13,000 cu yards and covers 1.2 acres (Appendix 8-1 Topsoil Stockpiles As Built Survey) and was essentially devoid of vegetation. The pile has a smooth concave shape that limits water infiltration. The piles were formed in 1988. The topsoil pile averages 6.7 feet and is 17 feet deep at its apex (Plate 8-2).

The subsoil pile holds approximately 36,000 cu yards and covers 1.4 acres (App 8-1). The pile averages 16 feet in depth and is 36 feet high at its apex (Plate 8-2). The pile is terraced on the northeast side and vegetation is evident in the terraces. The barren south-facing slope of the pile is steeply angled, as is the north face. Vegetation grows best in the shadows at the base of the slope of the north facing side and where run off is concentrated and trapped by silt fencing below the piles.

The MRP section 3.2.4 indicates that topsoil and subsoil piles were formed between 1978 and 1981 from areas shown on Plate 3-1 as Post Law areas. When the topsoil and subsoil piles were formed, they were worked over several times by disking, incorporation of fertilizer, drill seeding. Topsoil piles were reworked in the fall of 1989 (MRP, Section 3.5.2):

- 100 lbs/ac of phosphate was applied.
- Stockpiles were tilled to a depth of five inches on slopes less than 20%.
- Slope greater than 20% were walked over by a crawler tractor at right angles to the slope creating grouser tracks parallel to the slope.
- Lesser slopes were drill seeded and greater slopes were hydroseeded using the temporary seed mix shown on Table 3-1.
- 60 lbs/ac Tac and 2000 lbs/ac wood fiber mulch was applied.
- 100 lbs/acre of urea was broadcast over the site in the spring of 1990.

Although the purpose described in the MRP was to have the grouser tracks act as small retention grooves where-in seed and moisture would be trapped, the opposite effect occurred, since the tracks (running parallel to the slope) provided a route for water to run off the piles. This vegetation could be improved by reorienting the piles to have less of a south exposure and reshaping the piles to lessen the slope and create microbasins by gouging.

The soil to be disturbed for additional coal storage is shown on Plate 3-2 of AM02A and in the attached image P0003412.jpg. Soils had been previously mapped and are shown on Plate 8-1 as Chipeta Silty Clay, Killpack Silt Loam, and Saltair Silty Clay Loam. Soil in the vicinity of the Killpack Silt Loam and Saltair Silty Clay map units had been flagged by the Permittee to

indicate that topsoil would not be salvaged from the area. Visual observation of the flagged area revealed almost 100% cover by non-weedy species, predominantly saltgrass (Distichlis). For this reason, a soil sample was composited from eight subsamples within the flagged area (Sample #1, attached image P0003409.jpg). Subsamples were drawn from 0 – 6 inches, the projected depth of soil salvage.

Two more soil samples were drawn from the Chipeta soil, representing: a) the southeast area supporting only sparse vegetation (Sample #2, attached image P0003422.jpg) and b) northwest area supporting a vegetative community of shrubs and grasses (Sample #3, attached image P0003423).

Sample #2 (southeast Chipeta soils) was a composite of 8 subsamples drawn from a 0 –6 six inch depth. Sample #3 (northwest Chipeta) sample was a composite of 4 subsamples from 0 – 6-inch depth. The disparity in the number of subsamples was due to the soil development in Sample #3 soil that allowed the soil to remain aggregated on the spade and provided a greater sample size per hole to the sample bag. Sample #2 soil was very loose and had very little soil profile development, consequently, only about half of the soil lifted from sub-sample holes remained on the spade and then the hole was filled with loose, fine particles from the surface, so that a new hole had to be dug to get adequate representation of the six-inch depth soil.

Samples were brought back to the Salt Lake Office and pH and Electrical Conductivity measurements were taken on March 11, 2002 with the following results:

Soil Sample Map Unit	pH	EC (mmhos/cm)
Flagged Area (Saltair Silty Clay and/or Killpack Silt Loam)	7.7	4.8
Southeast half of area to be disturbed (Chipeta Silty Clay)	7.4	2.9
Northwest half of area to be disturbed (Chipeta Silty Clay)	7.8	2.6

Photographs taken during this field visit are saved in O:007022.sav/IMAGES/03062002. Attached are images that illustrate soil sampling locations.

The area of refuse storage has diminished as shown in attached image P0003420, but is not progressing as scheduled in Figure A3-4-1. The refuse pile was being re-mined at a rate of 2,000 tons/day through August of 2001. In September, that rate fell to 450 tons/day and by October 2001, re-mining had stopped entirely.

RECOMMENDATIONS/CONCLUSIONS:

Although no re-mining of the refuse pile is occurring at present, it appears that there is a large area that could either serve as coal storage or be contemporaneously reclaimed with live-hauled topsoil from the proposed coal storage location.

The southeast half of the area to be disturbed had no aggregation or profile development. It appeared as though these soils may have been disturbed in the past by vehicle traffic, although that is not indicated by Plate 3-1. Soil aggregation and profile development in this soil type is the key to soil infiltration. Water penetration of the soils can be improved by management practices such as incorporation of organic matter into the soil (i.e. test plot #2) and by creating microbasins to trap moisture and hold it long enough for it to infiltrate (i.e. evidenced by the subsoil pile terraces). Limiting the south exposure of the piles would also increase moisture content in the soil.

The flagged area soils had good structure and aggregation and supported a thriving vegetative community. The pH and EC of the flagged area soils was suitable for native plant species growth. Therefore, soils within the flagged area should also be included for topsoil salvage.

cc: Boyd Rhodes, Savage
Dan Guy, Blackhawk
O:\007022.SAV\Compliance\2002\FV_0306.doc

p0003409.jpg

p0003422.jpg

p0003423.jpg

p0003412.jpg

p0003420.jpg