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ACT/007/007

*True file
J. W. Winters with maps*

**KAISER
COAL**

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MAY 26 1987

**DIVISION OF
OIL, GAS & MINING**

May 18, 1987

Mr. Lowell P. Braxton, Administrator
Mineral Resource Development & Reclamation Program
Utah Division of Oil, Gas & Mining
355 W. North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Re: 1986 Annual Reports
Sunnyside ACT/007/007
Horse Canyon ACT/007/012
Wellington ACT/007/013

Dear Mr. Braxton:

As previously agreed, attached are the Soils and Vegetation sections of the subject reports. Your patience in waiting for this work is very much appreciated. Should there be any questions concerning it, please do not hesitate to contact either Mr. Barry Grosely or myself. Mr. Grosely is replacing me in engineering while I move into the personnel department.

Sincerely,

Carl W. Winters

Carl W. Winters
Senior Mining Engineer

attach

cc: B. J. Bourquin

*Re file
in
007/007 #2
1987*

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DIVISION OF
OIL, GAS & MINING

SUNNYSIDE MINES
ACT/007/007

1986 ANNUAL REPORT
SOILS & VEGETATION INFORMATION

MAY 18, 1987

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ATTACHMENTS

- Attachment 1 Locations of Interim Stabilization
- Attachment 2 Soil Data Analyses
- Attachment 3 Proposed Interim Seeding Mixture
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- Attachment 6 Icelander Wash Pond Reclamation
- Attachment 7 Plant Species Inventory for Slaughter and Whitmore
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- Attachment 8 Slaughter Canyon 1985 Cover Data
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- Attachment 10 Whitmore Canyon 1985 Cover Data
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- Attachment 12 Whitmore Canyon Reclamation Test Plot Cover Data
- Attachment 13 Whitmore Canyon Reclamation Test Plot Vigor Data
- Attachment 14 Coarse Refuse Reclamation Test Plot Data

ANNUAL REPORT FOR THE SUNNYSIDE MINES

INTRODUCTION

Kaiser Coal owns and operates the Sunnyside Mines. It maintains this property in accordance with Utah permit ACT 007/007. Responsibilities for this property include (1) interim reclamation activities; (2) permanent reclamation of disturbed areas; (3) monitoring of previously permanently reclaimed areas; and (4) monitoring of reclamation test plots. Accordingly this annual report contains sections which address these issues.

INTERIM RECLAMATION

During the fall of 1986, interim stabilization measures were implemented at the Sunnyside Mines on several areas. This temporary reclamation was conducted in order to protect soil and hydrologic resources, and to comply with permit requirements and stipulations. The goal of the interim stabilization or temporary revegetation program is to stabilize any disturbed areas that are subject to erosion or other environmental problems, and that cannot be permanently reclaimed for several years.

Background

A total of four sites involving approximately 6.5 acres were selected to receive interim stabilization. These areas were selected by Kaiser based on permit requirements and stipulations regarding runoff and erosion control from disturbed areas. The temporarily reclaimed areas are as follows:

- Reclamation Test Plot Topsoil Stockpile
- Reclamation Test Plot sideslopes and adjacent area
- Coarse Refuse Pile outslope
- Six spot repairs located along the Dugway

These sites generally included areas where disturbances had occurred or where no vegetative cover or other soil stabilization measures were in effect. Attachments 1(A,B,C) show the locations of these temporarily stabilized areas. Earthwork and surface preparation measures were similar for all areas except the sites located along the Dugway. Seeding was done by either drilling or hydroseeding methods, depending on slope.

The interim stabilization measures were designed such that they would not alter the established drainage system of the site. Consequently, all disturbed area runoff protection measures were maintained, and interim revegetated area runoff was either bermed or routed to and passed through sediment ponds.

Interim Stabilization Procedures

The reclamation stabilization procedures that were implemented at the Sunnyside Mines for the purpose of interim stabilization are as follows (1) soil sampling and analysis, (2) earthwork and recontouring; (3) seeding; and (4) hydromulching, fertilization, and tackifying.

Soil Sampling and Analysis

Soil samples were collected at all sites that were temporarily reclaimed. Samples were collected in order to determine soil characteristics, as well as determine required soil amendments and fertilizer levels. Sunnyside Soil Sample #1 was a composite sample obtained from the Stream Crossing area located near the coal loadout (0-8 inch depth); this area was not stabilized because of impending additional work scheduled for this area. Sample #2 was a composite sample obtained from the Reclamation Test Plot Topsoil Stockpile (0-12 inch depth). Sample #3 was obtained from the Reclamation Test Plot sideslopes and adjacent area (0-12 inch depth). Sample #4 was obtained from the Coarse Refuse Pile outslope (0-12 inch depth). Sample #5 was a composite sample collected from the six spot repairs located along the Dugway (0-8 inch depth). Sample #6 was a composite sample collected at the Mancos Shale Borrow area located near the Coarse Refuse toe (0-16 inch depth); this area was not disturbed or reclaimed in 1986. Sample #7 was a composite sample collected from the Icelander Pond reclamation site scheduled for permanent reclamation in 1986 (0-12 inch depth). Each sample was a composite sample taken from a minimum of three locations within the area being sampled. Since the primary objective of this sampling was to identify soil amendments and fertilizer levels of the areas to be reclaimed, it was judged that the sampling depths were sufficient for this purpose. Furthermore, nutrient uptake in plants takes place largely within this soil horizon.

Samples were analyzed for the following parameters: saturation percent, pH, conductivity, calcium, magnesium, sodium, SAR, nitrogen/nitrate, phosphorus, potassium, neutralization potential as percent CaCO₃, organic matter, general texture class, and the percent sand, silt, and clay. Attachment 2 presents the results of the soil analyses. All samples were analyzed according to DOGM Guidelines.

Earthwork and Recontouring

All earthwork, regrading, fertilizing, seeding, and mulching was contracted to B and R Reclamation, Helper, Utah, under supervision of Kaiser Coal.

Areas located along the Dugway had been previously regraded in order to better channel runoff into sediment control structures or drainage channels. These areas were not ripped, disked, or otherwise disturbed. Hydroseeding was completed on in-place materials, followed by mulching and fertilization as described in that section.

The earthwork on all other areas included scarification of the in-place materials utilizing a crawler tractor equipped with a ripper. The ground was ripped to a depth of approximately 18 inches to reduce surface compaction, to provide a roughened surface (thus ensuring mulch adherence), and to promote vegetational root penetration. On areas with moderate slopes, the materials were then disked to further reduce compaction. Following surface preparation, all areas were seeded, fertilized, and mulched.

Seeding, Fertilization, and Mulching

The goal of the temporary revegetation program is to stabilize selected disturbed areas that cannot be permanently reclaimed for several years. For these purposes, an interim seed mixture was developed in cooperation with DOGM. This mix was developed based on the species potential ability to stabilize the area in order to minimize soil erosion and to protect hydrologic resources. A mixture of leguminous and grass species was chosen because it will increase soil nutrients, including nitrogen, thereby improving soil characteristics. The seed mix and seeding rates were proposed in a letter from Doug Pearce to John Whitehead (Attachment 3). Final seeding mixtures and rates are presented in a letter from Lowell Braxton to Marty Holmes (Attachment 4).

The Topsoil Stockpile, Coarse Refuse Pile outslope, and areas located along the Dugway were all hydroseeded. The Reclamation Test Plot sideslope area was drill seeded and dragged with a chain. Following seeding, approximately 2,000 pounds of wood fiber mulch per acre with 60 pounds of tac in combination with fertilizer were oversprayed on all areas. Fertilizer was applied at a rate of 200 pounds of 16-16-8 per acre with the mulch and tackifier.

Seeding of the areas was completed by November 14, 1986. Revegetation success of this interim stabilization effort will be judged by the vegetation's ability to stabilize soils and prevent erosion. Success will be a qualitative determination based upon field observations by Kaiser and DOGM.

PERMANENT RECLAMATION

Kaiser had previously completed final reclamation of the Slaughter Canyon and Whitmore Canyon Tar Sands loadout disturbances. Vegetation data are presented in the Section on Permanent Sampling Results. In 1986, Kaiser also permanently reclaimed the Icelander Pond, as well as an exploration drill hole (DDH 86-1) located in Whitmore Canyon.

Icelander Pond

Drainage and slope configuration specifications were submitted to the Division and approved prior to the initiation of final reclamation activities. The Icelander Pond is located within the Pinyon-Juniper/Grass vegetation type. Minor modifications were made to the originally approved reclamation mix for that type due to seed

unavailability. Attachment 5 discusses those modifications. All other species were seeded at the rates in the original mix.

The Icelander Pond area was regraded according to approved specifications. The area was then ripped a minimum of 18 inches to reduce compaction of soil materials and to increase roughness of the material to improve moisture absorption. The area was then hydroseeded, mulched, fertilized, and tacked as discussed in the preceding section. Fertilizer was applied at a rate of #200/ac of 16-16-8. Reclamation was completed by October 31, 1986, in accordance with Division recommendation (Attachment 6).

Whitmore Canyon Drill Hole

An exploration drill hole (DDH 86-1) was located in Whitmore Canyon for the purposes of coal exploration and groundwater monitoring. The total area disturbed was less than 1/4 acre, with the disturbance related primarily to removal of vegetation and the construction of a small mud pit. After drilling was completed, the area was regraded and reseeded. The area was ripped a minimum of 18 inches; subsequently it was hydroseeded, mulched, fertilized and tacked. Procedures for this area were the same as those conducted on the Icelander Pond area. The seed mix utilized was the same permanent seed mix as that used for the Icelander Pond area (Attachment 5).

PERMANENT RECLAMATION SAMPLING RESULTS

Two permanently reclaimed sites were sampled in 1985 and 1986 to determine plant establishment and reclamation trends. These two sites are Slaughter Canyon and the Whitmore Canyon Tar Sands loadout area.

Slaughter Canyon

A reclamation plan was submitted to and accepted by the Division for the Slaughter Canyon project in 1983; final reclamation was completed in the spring of 1983. Ground cover data were collected both in 1985 and in 1986 and are presented in this section.

Sampling Methodology

The methodology utilized for sampling ground cover was the same as that outlined in the Sunnyside Mines permit for use on reclaimed areas (ACT 007/007). Ground cover was estimated using the point line method, where the plant cover was read by dropping a pin through a frame every 0.5 meter along a 25 meter transect. The first object encountered by the pin was the recorded cover for that object, e.g. plant by species, rock, bare ground, or litter. An adequate number of samples were taken utilizing the DOGM sampling adequacy formula presented in the Vegetation Guidelines. No density samples were taken since overall shrub establishment was very low, although some preliminary shrub establishment has occurred.