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

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January 30, 1998

TO: File

THRU: Joe Helfrich, Permit Supervisor *JH*

FROM: Jess Kelley, Reclamation Specialist *JK*

RE: Abatement Plans for NOV N97-45-1-1 (Amendment 97F), Horizon Coal Corporation, Horizon Mine, ACT/007/020-AM97F-2, Folder #2, Carbon County, Utah

SUMMARY:

On November 3, 1997, the permittee submitted for Division approval an amendment for the abatement of Notice of Violation (NOV) N97-45-1-1. The Division found that this amendment lacked the necessary specific information and rejected it.

The permittee resubmitted the amendment on December 5, 1997. The Division found a number of deficiencies in the reclamation plan revisions in this submittal and returned it to the permittee for correction.

On January 16, 1998, the permittee submitted corrections to the December 5, 1997 submittal. This submittal dealt mainly with issues of hydrology and soils, but Division Soils Reclamation Specialist Robert Davidson, who is the lead reviewer of the submittal, asked this writer to review the maps and cross sections contained therein. This technical memorandum constitutes the findings of this writer's from that review.

TECHNICAL ANALYSIS:

OPERATION PLAN

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Mining facilities maps.

In 1997, the turnaround area at the confluence of Portal Canyon and Jewkes Creek was enlarged. This enlargement was designated Amendment 97F. The pad in that area was extended approximately 100 feet up Jewkes Creek and the bypass culvert underlying the pad was also lengthened to accommodate the extension.

The permittee revised Plate 3-1--Surface Facilities to show the culvert and pad extension of Amendment 97F. This map was certified January 16, 1998 by Richard B. White, a professional engineer registered in the state of Utah.

Findings:

The plan fulfills the requirements of this section.

RECLAMATION PLAN

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Reclamation backfilling and grading maps.

In 1997, the turnaround area at the confluence of Portal Canyon and Jewkes Creek was enlarged. This enlargement was designated Amendment 97F. The pad in that area was extended approximately 100 feet up Jewkes Creek and the bypass culvert underlying the pad was also lengthened to accommodate the extension.

The permittee revised Plate 3-7--Reclamation Topography to show the anticipated final surface configuration of the culvert and pad extension area of Amendment 97F. Plate 3-7 also shows the locations of 8 cross sections which were derived from this map and are shown on Plate 3-7A--Post Mining Cross Sections.

The permittee used the cross sections shown on Plate 3-7A to derive cut-and-fill

volume estimates for final reclamation. These estimates are shown in Table 3-1, page 3-30. They show an estimated cut volume of approximately 11,238 cubic yards and an estimated fill requirement of approximately 12,939 cubic yards.

Plates 3-7 and 3-7A were certified January 16, 1998 by Richard B. White, a professional engineer registered in the state of Utah.

Final surface configuration maps.

In 1997, the turnaround area at the confluence of Portal Canyon and Jewkes Creek was enlarged. This enlargement was designated Amendment 97F. The pad in that area was extended approximately 100 feet up Jewkes Creek and the bypass culvert underlying the pad was also lengthened to accommodate the extension.

The permittee revised Plate 3-7--Reclamation Topography to show the anticipated final surface configuration of the culvert and pad extension area of Amendment 97F. This map was certified January 16, 1998 by Richard B. White, a professional engineer registered in the state of Utah.

Findings:

The plan fulfills the requirements of this section.

RECOMMENDATION:

It is recommended that the maps, cross sections, and reclamation earthwork volume estimates of Amendment 97F be accepted as fulfilling the abatement requirements of NOV N97-45-1-1.



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February 2, 1998

Denise Dragoo, Resident Agent
Van Cott, Bagley, Cornwall, & McCarthy
50 South Main Street, Suite 1600
Salt Lake City, Utah 84111-1495

Re: Abatement Plans for NOV N97-45-1-1, Horizon Coal Company, Horizon Mine, ACT/007/020-97F-2, File #2, Carbon County, Utah

Dear Ms. Dragoo:

The abatement plans for the referenced notice of violation still contain several deficiencies. They are outlined as follows:

ENVIRONMENTAL RESOURCE INFORMATION

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.21, 817.200(c); R645-301-220, -301-411.

Analysis:

Appendix 8-1, Soils Data, contains Environmental Resource Information for the imported topsoil resources that were distributed within the disturbance area on the north facing slopes within Portal Canyon and the lower end of Jewkes Creek. The imported topsoil was placed within three designated areas (Area A, B, & C, Plate A, Appendix 8-1).

Sampling and characterization of the imported topsoil resources after placement was performed on November 12, 1997. The purpose for sampling was to characterize the soil according to the Division's guidelines for topsoil and overburden.¹ Random samples were taken from each area and a composite made, giving three separate composite samples representing each

¹ Leatherwood, James, and Dan Duce. 1988. Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining. State of Utah, Department of Natural Resources, Division of Oil, Gas and Mining. Salt Lake City, Utah.

of the three areas. Using grid sections and randomized numbers, five sample pairs each were collected from Areas A and B and seven pairs from Area C. The location of these randomized sample points are illustrated on Plate A, Appendix 8-1. Samples were obtained using a 12-inch long, 4-inch diameter bucket auger. Auger cores were taken, using the same depth/volume of soil at each location. After mixing the bulk composite samples, representative cuts were taken and submitted to the laboratory for analysis.

Laboratory data sheets are included in Appendix 8-1, in addition to the summarized data in table format. Based on the sample analysis results, soils in all three areas meet the Division guidelines for topsoil and overburden.

Findings:

The information provided meets the minimum regulatory requirements of this section.

OPERATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Amendment 97F updates the operation plan with additional information as follows to meet the remedial action requirements for abatement of N97-45-1-1:

- Imported Soil's Placement and Volumes
- Soil Salvage Updates
- Disturbed Topsoil Stockpile Soil Placement
- Resoiled Areas Protection and Stabilization
- Plate 3-1, Surface Facilities

Imported Soil's Placement and Volumes

Section 8.8.1, Resoiled Areas, Appendix 8-1, and Plate A Appendix 8-1 all give an accounting of soil imported into the surface disturbance area, placement locations, thickness,

affected acreage, and soil volumes. Appendix 8-1 contains an "Imported Topsoil Table" identifying topsoil volumes by location. The total amount of topsoil imported is 975 cubic yards distributed between Areas A, B, and C with soil placement thickness between 10 to 12 inches.

The locations within the disturbed area which received the imported topsoil are designated on Plate A, Appendix 8-1. They are identified as soils removed and placed by land owner's contractor during the county road realignment. Area A is located at the lower Jewkes Canyon surface disturbance area; Area B and C are located along the lower to mid south slope in the Portal Canyon area.

Soil Salvage Updates

A new table, Topsoil/Growth Medium Recovery and Placement Calculations, is located in Appendix 8-1. Information in the table, Appendix 8-1 is presented as follows:

- The surveyed volume of topsoil recovered during mine construction, prior to the UC-3 culvert extension, is shown as 10,993 cubic yards.
- The 10,993 cubic yards excludes the un-salvaged, south hillside which is located at the toe of the stockpile. This hillside is described in detail in Section 8.8.1 and is shown on Plate A, Appendix 8-1.
- The current surveyed volume of soil in the stockpile, prior to the UC-3 culvert extension, is shown at 10,494 cubic yards. This volume takes into account the 499 cubic yards of topsoil that was removed from the stockpile during repair of the crushed culvert and placed on Area D (Section 8.8.1 & Plate A, Appendix 8-1).
- The total surveyed volume of soil currently placed in the stockpile, prior to the UC-3 culvert extension, including the in-place soils available in Area 10 and 11, is estimated at 14,448 CY. This volume does not include the volume of soil imported to Areas A, B, and C.
- The resulting survey volume of soil agrees with the 1996 calculated topsoil salvaged during construction. The soil-salvage report submitted by EarthFax to Horizon, Appendix 8-1, Soil Salvage Practices Fall 1996, December 15, 1996 calculated a stockpile volume of 15,312 CY and a compaction corrected volume of 13,741 CY, which included Area 10 & 11. The estimated projected volume of soil to be salvaged at the start of construction was estimated at 13,670 cubic yards as shown in Table 8-3, Chapter 8.

Disturbed Topsoil Stockpile Soil Placement

This section, and the following section, both discuss activities that occurred during the 1996 and 1997 construction phases of mine development. Section 3.5.1 of the current Mine Reclamation Plan refers to these activities as "Contemporaneous Reclamation." Otherwise, these activities are considered reclamation and are covered by R645-301-240, Reclamation Plans.

Section 8.8.1, Resoiled Areas, includes discussion on the topsoil removal from the stockpile and soil placement in Area D (see Plate A, Appendix 8-1). During the repair of the crushed culvert, permission was granted from the Division's Price office for disturbing a portion of the stockpile. Soil was subsequently removed from above and around the crushed culvert which runs through the topsoil stockpile. The culvert was crushed during portal construction, thus requiring repair (see N97-26-5-1). The damaged portion of UC-2 culvert was replaced and installed within the topsoil stockpile. Topsoil was used to fill around and bury the repaired culvert; no fill material was used during the original installation nor during the culvert repair.

Area D (Plate A, Appendix 8-1) received 499 cubic yards of the displaced topsoil from the stockpile disturbance during the culvert repair. Approximately 11 inches of topsoil was placed on the hillside above the supply building, office, and bath house locations. The amendment discusses that adjacent in-place undisturbed and pre-Horizon Mine soils above Area D were disturbed by machinery during soil placement. The in-place soils were graded and blended with the surface of the topsoiled area.

Resoiled Areas Protection and Stabilization

The amendment states that all resoiled areas during 1997 will be retained and not re-disturbed except to receive seed, mulch, and fertilizer. This includes areas receiving imported topsoil and soil redistributed from the stockpile (Areas A, B, C, & D, Plate A, Appendix 8-1). These soiled areas were seeded, fertilized and stabilized as described in Section 3.5.1.

For the short term to protect these areas from erosion, the surfaces were roughened with either the tracks of a dozer or a trackhoe prior to mulching and reseeded. Seed mix 1 was applied using hydro seeding. It appears as though the seed and mulch were applied in the same application since the amendment then states that the hydro-seed mixture included long fiber mulch with a tackifier was then applied. The blanket of seed and mulch is used to provide temporary protection from surface erosion. The operator plans on maintaining the resoiled areas by filling rills and gullies and reseeded when necessary until vegetation is established.

Permanent protection against erosion of the resoiled areas will be achieved by vegetation

reestablishment and by excluding disturbance of these resoiled areas. The amendment then proposes other possible methods of protection, but does not commit to any specific method. Protection of the Portal Canyon slope which parallels the coal stockpile will be provided by installing concrete jersey barriers at the bottom of the slope to prevent equipment from accessing the slope. In addition, the barriers would form a boundary for the bottom of the coal stockpile. Should the resoiled areas adjacent to the coal loading facilities become impacted with coal, alternate methods will be used for removing the coal, i.e., vacuuming.

Plate 3-1, Surface Facilities

A surface facilities' map (Plate 3-1, Surface Facilities) has been submitted which updates operational contours as a result of altered topography from both the topsoil placement during "contemporaneous reclamation" and the illegal installation of the UC-3 culvert extension. Both these operational activities have had a direct impact on the current surface topography (see NOV N97-45-1-1 and CO 98-26-1-1). This Technical Analysis considers the unauthorized placement of topsoil while CO 98-26-1-1 deals with the illegal installation of the UC-3 culvert extension.

Findings:

The information provided meets the minimum regulatory requirements of this section.

RECLAMATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

The reclamation portion of the culvert extension amendment contains the following items that are either discussed or still need additional corrections:

- Soil Redistribution
- Reclamation Updates

Soil Redistribution

Section 8.8, Plans for Redistribution of Soils, and Plate B Appendix 8-1, contains information for soil redistribution. This information has been updated as impacted from the 1997 activities of importing topsoil and distributing topsoil from the disturbed stockpile during the

crushed culvert repair. During final reclamation, topsoil placement thickness will be 23 inches. The thickness of topsoil placement is calculated from the total available topsoil divided by the total area to receive topsoil. Plate B, Appendix 8-1, shows all reclamation areas that will receive topsoil. As shown, not all of the surface within surface disturbance area boundary is disturbed and, therefore, only 4.75 acres of the 9.15 acres of disturbance will actually receive topsoil. *However, the soiled portions as shown on Plate B, Appendix 8-1, do not agree with the altered reclamation topography as shown on Plate 3-7, Reclamation Topography. The south slope of Portal Canyon and the northeast hillside adjacent to the UC-3 culvert extension both contain additional altered reclamation topography that will need topsoil placement as shown by the darkened contour lines.*

Reclamation Updates

The unapproved reclamation activities (N97-45-1-1) altered the approved Mine Reclamation Plan by changing calculated final reclamation fills thereby invalidating portions of the approved reclamation plan. Amendment 97F addresses and supplies the following:

- Details regarding the reestablishment of both drainage areas in Jewkes Creek and Portal Canyon are provided in the currently approved MRP, Section 7.2.3.2.
- The road on the north side of Portal Canyon will be reclaimed by backfilling, regrading, and top-soiling.
- A simple one sentence statement is given that states: "In general, fill material for reclamation will be obtained from adjacent areas of cut material." *The MRP still needs specific discussion concerning the impact of contemporaneous reclamation of "adjacent" hillsides on the following: (a) ultimate removal of construction fills for reestablishment of drainage ways and (b) ultimate placement of construction fills against the reclaimed hillsides.*
- Updated reclamation cut and fill calculations are provided in Table 3-1.
- Plates 3-7, Reclamation Topography, and 3-7A, Post Mining Cross Sections, are provided showing revised reclamation contours and cross sections.

Findings:

The information provided does not meet the regulatory requirements of this section. Prior to approval, the permittee must provide the following in accordance with:

R645-300-142 and 143, R645-301-120, R645-301-500 and R645-301-600, Two part:

(1) The soiled portions as shown on Plate B, Appendix 8-1, do not agree with the altered reclamation topography as shown on Plate 3-7, Reclamation Topography. The south slope of Portal Canyon and the northeast hillside adjacent to the UC-3 culvert extension both contain additional altered reclamation topography needing topsoil placement as shown by the darkened contour lines. (2) The MRP still needs specific discussion concerning the impact of contemporaneous reclamation of "adjacent" hillsides on the following: (a) ultimate removal of construction fills for reestablishment of drainage ways and (b) ultimate placement of construction fills against the reclaimed hillsides.

Reclamation Plan

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Grading to Drain and Approximate Original Contour

The permittee has committed to keep surface drainage from entering sealed entries in section 3.5.3.1. The permittee has committed to re-contour the area to drain to the final reclamation channel in section 3-25. However, contour information on the reclamation topography plate 3-7 shows an area near the confluence of Jewkes Creek and the Portal canyon drainage which does not drain to the channel. This area retains the existing road configuration. The retention of the road bed here has the potential to concentrate water and increase erosion potential. This area should be reconfigured to grade with the surrounding hillside and the road bed configuration should be removed.

Diversions

The permittee has proposed a drainage plan which re-configures Jewkes Creek's drainage channel and Portal Canyon drainage channel. The new configuration of Portal Canyon eliminates the basin behind the existing embankment.

Portal Canyon was designed to carry a peak flow of 9.95 cfs. The permittee's analysis assumed a one foot flow line because no high water mark was found. Since this is an ephemeral system it is often difficult to determine the height of the channel forming flows. Typically the

channel forming flows are high intensity short durations events in ephemeral systems. Based on the presented design information the design capacity of this channel exceeds the minimum required design flow for an ephemeral system. Based on the topography provided on plate 3-7 the portal canyon channel will have a maximum slope of 0.16 ft /ft and a minimum slope of 0.02 ft/ft. The Portal Canyon channel design should use the maximum channel slope as presented in the proposed configuration for channel designs.

The Upper Jewkes Creek channel is designed to carry 143.5 cfs in the combined channel and flood plain configuration while, the Lower Jewkes Creek channel is designed to handle a combined channel and flood plain flow of 150.6 cfs. The estimated capacity of the upper end of the disturbance was 27.65 cfs based on a high water mark. The estimated capacity of the downstream channel below the disturbance was determined to be 38.67 cfs. The reclamation channel capacity downstream is designed to exceed the capacity of the Jewkes Creek channel upstream and down stream of the site based on presented design information. The design will allow flows from the design 100- year, 6-hour event to pass through the channel and flood plain configuration.

The centrally-located channel section is placed away from the toe of steep backfilled slopes. A small riprapped channel section is designed to carry a low flow from the 10-year, 6-hour event. A sand filter blanket is provided to promote recharge into the surrounding soils. **See the Jan. 16, 1988 memo regarding riprap sizing.**

The Jewkes Creek channel design is intended to provide a means to re-establish the riparian vegetation, existing at the site prior to disturbance, and is intended to simulate the pre-mining channel configuration while considering other site conditions. Some issues that are related to the success of the permittee's proposal are based on the hydraulic characteristics of the soil adjacent to the channel, the gradient downstream of the site and, the amount of sediment and intensity of flows being transported through the system. Intuitively it seems the areas of steeper gradient would not contain the check dams and the accumulation of flow and flatter gradient would be used to establish the riparian area. The proposed design concept is to decrease the gradient through deposition within the higher gradient areas. The ability of this design to be stable may be measured through the ability of the design to withstand flows received at the site.

According to Rosgren's Classification system Jewkes Creek would approximate an "E stream type" configuration. The channel type is based on characteristics of the existing stream gradient assuming a moderate sediment supply and healthy vegetation. The classic channel under these conditions would have a width to depth ratio less than 12, an entrenchment ratio greater than 2.2, a sinuosity greater than 1.5 and, a surface water slope less than 0.02. Because there is a high sediment load in the existing system (upstream logging presently occurring) and because the potential for additional flows from the reclaimed channel section and an increased slope, a channel more closely resembling a "C stream type" might be more appropriate.

The upper channel RD-2 is designed to include channel slope ranging from 0.03 to 0.07 ft/ft. The minimum slope based on the topographic contour information is 0.015 ft/ft and the maximum slope is 0.049 ft/ft. Loose rock check dams, 1.5 ft high with a designed spillway, and apron will be installed at upstream and downstream locations. The most efficient spacing is to place the check dams at the upstream toe of the deposition behind the previous check dam (Heede, 1976). To determine this distance, for an initial gradient less than 20%, the deposition behind the slope is approximately 0.7 of the initial gradient. This would result in slopes of 0.034 and 0.011 ft/ft behind the dams following accumulation of sediment. A spacing of approximately 136 linear feet between dams would result for the 0.015 slope and approximately 44 linear feet between dams would result for the 0.049 slope. The proposed locations are in the steeper section of the channel and are designed between 75 and 50 feet apart. These distances appear appropriate for the proposed gradient where the check dams are located according to plate 3-7.

The lower channel RD-3 is designed to include a channel slope ranging from 0.02 to 0.07 ft/ft. The lower portion will have check dams while the upper section will not incorporate check dams. The minimum and maximum slopes, based on Plate 3-7, are 0.08 and 0.027 ft/ft. The design provides a small channel within a larger channel to construct a flood plain while providing stability. The typical bottom width of the flood plain is 30 feet while the base channel will be 8 feet wide and contain the low check dam with a four foot wide notched spillway. The design proposed eliminates check dam keys. These were determined unnecessary by the designer because they are surrounded with the channel filter blanket. Check dam keys are designed to anchor the structure and to retain flow within the channel preventing water from cutting around the structure. Cutting usually occurs once sediment is deposited behind the structure and water spills over the length of the dam. Should significant cutting of this nature occur design reconstruction may be necessary. The designs provided considers the site conditions and the goals of reclamation and meets the regulatory requirements for design flow.

During reclamation the 4 inch pipeline from Sweets Pond to the mine site will be disconnected, the end of the pipes will be plugged and, the pipeline abandoned in place. The reclamation for this site should be performed in a timely manner since it is no longer proposed to be used.

Findings:

The permittee must provide the following, in accordance with the requirements of:

- R645-301-731.** 1) The maximum slope in the proposed reclamation site configuration, as shown on Plate 3-7, should be used where the maximum slope is used to design the channel especially for Porter Fork where the difference is significant. 2) Regrade the area which retains the road at the junction of Portal Canyon and

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Jewkes Creek to blend with the surrounding hillside. The road bed configuration should be removed as this area has the potential to concentrate water and increase erosion.

RECOMMENDATION:

The identified deficiencies should be addressed and incorporated into the plan prior to approval of this document.

The notice of violation has been extended to February 9, 1998, for the permittee's complete and accurate response to the referenced deficiencies, and Feb. 23, 1998 for final abatement for the referenced abatement.

If you have any questions, please call.

Sincerely,



Joseph C. Helfrich
Permit Supervisor