



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

Michael O. Leavitt
Governor

Ted Stewart
Executive Director

James W. Carter
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

January 8, 1996

TO: File

FROM: Jess Kelley, Reclamation Engineer *JK*

RE: Response to Division Order 95A, Trail Mountain Mine, PacifiCorp, ACT/015/009 DO-95A, Folder No. 2, Emery County, Utah

SYNOPSIS

The Division issued Division Order 95A to the permittee on October 3, 1995. The purpose of the Division Order was to correct a number of defects in the approved mine plan, all of which resulted from the recent change of the principal mining method from room-and-pillar to longwall.

In accordance with the requirements of the Division Order, the permittee made the present submittal to the Division on November 9, 1995. This memorandum contains this writer's analysis of that submittal. The analysis is written in the current Technical Analysis (TA) format, in which form it can be inserted directly into the approved TA for this site.

ANALYSIS

The permit defects are set forth in the Division Order as follows. This memorandum deals only with the first two:

- 1) Descriptions of the measures to be used to maximize the use and conservation of the coal resource are not consistent throughout the Permit Application Package (PAP) and have not been accepted by the Bureau of Land Management.
- 2) The subsidence control plan does not provide adequate descriptions of the conditions that affect the likelihood or extent of subsidence and subsidence-related damage.
- 3) The Probable Hydrologic Consequences (PHC) determination is

outdated and a new or updated PHC determination must be made.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR Sec. 783., et. al.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Coal Resource and Geologic Information Map

This operation encompasses 3 Federal leases and one state lease. The 3 Federal leases are designated U-64375, U-49332, and U-082996. The single state lease is designated ML-22603.

Plate 3-2--Mining Plan and Plate 3-3--Areas of Coal Recovery show the boundaries of the leases, along with the permit area boundary, the location of the coal outcrop, the anticipated timing and layout of entry development, and the anticipated timing and layout of longwall panel development and mining. Plate 3-3 also shows the coal reserve information found in Table 3-1. These maps were prepared and certified in 1995 by John Christensen, a professional engineer registered in the state of Utah.

Mine Workings Maps

Plate 3-2--Mining Plan and Plate 3-3--Areas of Coal Recovery show the anticipated timing and layout of entry development and of longwall panel development and mining, along with lease boundaries, the permit area boundary, and the location of the coal outcrop. Plate 3-3 also shows the coal reserve information found in Table 3-1. These maps were prepared and certified in 1995 by John Christensen, a professional engineer registered in the state of Utah.

Findings:

The plan fulfills the requirements of this section.

OPERATION PLAN

MINING OPERATIONS AND FACILITIES

Regulatory Reference: 30 CFR Sec. 784.2, 784.11; R645-301-231, -301-526, -301-528.

Analysis:

Type and Method of Mining Operations

In 1994, the permittee, PacifiCorp, acquired this mine from Mountain Coal, which had employed conventional room-and-pillar mining techniques using continuous mining machinery. After extensive modification and renovation of both the surface facilities and the underground operation, PacifiCorp reopened the mine in 1995 as a longwall retreat operation.

In longwall retreat mining in general, gateroad entries are driven off the main entries, on both sides of the planned panel, to the farthest extent of that panel. These gateroad entries are then connected at the far end by bleeder and setup entries, between which a protective barrier pillar of solid coal is left to insure their stability. The longwall machinery is then set up in the setup entry and mining "retreats" toward the main entries. As the longwall face approaches the main entries, coal extraction ceases and a barrier pillar of solid coal is left between the mined out panel and the main entries to protect the stability of the main entries. Barrier pillars are also left between panels to protect the stability of the gateroad entries, beneath surface features such as perennial streams, oil and gas wells, and power lines to protect them from subsidence, between mine workings and outcrops to protect escarpments from failure, and at the permit area boundary to insure that subsidence is contained within the permit area (pages 3-14 to 3-19).

At this particular mine, the width of the longwall face between gateroad entries ranges from 500 feet, which is the minimum economical width, to 1,000 feet, with the average being about 750 feet. Panel length varies greatly, depending on geologic conditions, but the minimum economical length is about 1,500 feet (page 3-15).

The gateroad design at this mine is known as a "two-entry yield pillar" configuration. Gateroads consist of double, 20-foot-wide entries which are spaced apart on 50-foot centers and connected by crosscuts which are spaced apart on 100-foot centers along the length of the entry. By allowing for the gradual yielding of the gateroad support pillars, this configuration prevents the localized buildup of stresses in the roof, near the corners of the entries, which can result in dangerous rock bursts (page 3-15).

All longwall panels to be developed and mined from 1995 through the year 2002 will be developed east and west off the 5th left mains, which run north and south. The 3rd west mains, which run west from and perpendicular to the 5th left mains, will be driven west to the present permit area boundary in anticipation of future lease acquisitions. Panels are designated, from north to south, 2nd east through 5th east to the east of the 5th left mains, and 1st right through 12th right to the west of the 5th left mains. The panel extraction sequence will be 2nd east through 5th east, 12th right through 9th right, and 6th right through 1st right (page 3-17).

Coal is brought from the mining and development sections by 48-inch section conveyors. The section conveyors then transfer the coal to the 60-inch main conveyor, which carries it to the run-of-mine (ROM) transfer, which lies just outside the belt portal. From the ROM transfer, the coal can either go by the 60-inch transfer conveyor to the Cottonwood Mine, or else by the 54-inch crusher feed conveyor to the onsite crusher and thence to the storage silo or the overflow stockpile. If the coal goes to the Cottonwood Mine, it is crushed from its ROM size of 16"x 0 to 6"x 0 and hauled by truck to the Hunter Power Plant. If it goes to the storage silo or the overflow stockpile, it is first crushed to a size anywhere between 6"x 0 and 2"x 0 and then hauled to its final destination by truck (pages 3-4, 3-19).

This operation encompasses 3 Federal leases and one state lease. The 3 Federal leases are designated U-64375, U-49332, and U-082996 and contain a combined total of 21,234,002 recoverable tons of coal. The single state lease, which is designated ML-22603, contains no recoverable coal. Therefore, only entries, but no mining panels, have been or will be developed in the state lease. Total coal production is expected to range from 3.5 million to 5 million tons per year, which, barring the addition of other leases, gives this mine a life of about 4 to 6 years (pages 3-11, 3-21).

Findings:

The plan fulfills the requirements of this section.

COAL RECOVERY

Regulatory Reference: 30 CFR Sec. 817.59; R645-301-522.

Analysis:

This operation consists of 3 Federal leases and one state lease. The 3 Federal leases are designated U-64375, U-49332, and U-082996. The single state lease is designated

ML-22603. The estimated coal reserves contained in these leases are summarized in the following table (page 3-21, Plate 3-3).

Trail Mountain Coal Reserves

Lease	In-Place (tons)	Minable (tons)	Recoverable (tons)
Federal Lease U-64375	44,874,379	35,667,886	20,167,382
Federal Lease U-49332	4,666,670	4,310,698	973,002
Federal Lease U-082996	276,954	276,954	93,618
State Lease ML-22603	1,035,160	0	0
Totals	50,853,163	40,255,538	21,234,002

The permittee is committed to recovering the maximum amount of coal possible. Only necessary barrier pillars will be left behind, as discussed in **Type and Method of Mining Operations** under **MINING OPERATIONS AND FACILITIES** above. The longwall machinery and methods used at this site make for the highest recovery rate of any known technology. The recovery rate is expected to be about 80% within the panels and 60% overall (pages 3-19, 3-20).

On December 5, 1994, the permittee submitted to the Bureau of Land Management (BLM) a Resource Recovery and Protection Plan (R2P2), describing the proposed mining methods and technologies for maximizing the recovery of the coal resource at this site. The BLM found a number of deficiencies in the R2P2 and, for several months, the permittee and the BLM held discussions and made proposals and counterproposals in an effort to correct those deficiencies. On August 30, 1995, the BLM granted the permittee permission to continue developing the gateroad entries in the 3rd east panel "up to, but not including, the proposed setup room . . ." Then, on September 25, 1995, the BLM issued a final decision rejecting the proposed R2P2. As a result, on October 4, 1995, the permittee filed a complaint against the BLM in Federal District Court and the Court ordered the contending parties to negotiate an agreement to allow the mining operation to continue. On October 5, 1995, the permittee and the BLM came to such an agreement. This agreement allows the permittee to continue to develop the 5th left mains and to develop and mine to and including the 4th east longwall panel. The permittee cannot, however, develop the 5th east gateroads unless and until the litigation resolves the outstanding R2P2 issues, the BLM grants the permittee further temporary relief, or the Court orders some other course of action.

The permittee and the BLM have not yet resolved the outstanding R2P2 issues. The permittee thus continues to operate under the terms of the Court-approved October 5, 1995 agreement, but without an approved R2P2. The Division cannot approve the plan until an R2P2 has been approved by the BLM.

Findings:

The plan does not fulfill the requirements of this section.

The plan does not fulfill the requirements of this section. The permittee must provide the following, prior to approval, in accordance with the requirements of:

R645-301-522

The permittee must obtain formal approval of the Resource Recovery and Protection Plan (R2P2) from the Bureau of Land Management (BLM) and provide the Division with documentation of that approval.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR Sec. 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Renewable Resources Survey

The permittee has conducted a structure and renewable resource survey of that part of Trail Mountain which might possibly be affected by subsidence. The permittee has determined that renewable resources are present in the form of seeps, springs, ephemeral and intermittent streams, grazing land, timber, wildlife, and wildlife habitat. There are no perennial streams, cabins or manmade structures, oil, gas or water wells, or oil or gas pipelines (page 11-1).

Subsidence Control Plan

Coal will be mined at this site by longwall mining methods. Conventional room-and-pillar methods with continuous mining machinery will be used only for entry and panel development. Longwall mining is, by definition, a method of controlled subsidence. Barrier pillars will be left in place at property boundaries to contain all subsidence within the

permit area, and between mine workings and coal outcrops to protect escarpments from failure. All other barrier pillars will be for entry protection only--not for surface protection--and will be designed to yield gradually (page 11-4).

The permittee predicts that subsidence will average about 75% of the extraction height and that the angle of draw will be a very steep 3 to 15 degrees. On the basis of subsidence prediction studies, as well as past experience at this site and other similar sites in the area, the permittee predicts that the effects of subsidence on the surface will be very slight and inconspicuous. The cover above the mine workings is very deep (700-1100 feet) and contains thick, consolidated sandstone strata which lessen the upward propagation of subsidence. The uppermost stratum is the North Horn formation, which is composed of poorly consolidated clay minerals and thus tends to deform plastically rather than fracture. Longwall mining tends to lower the overlying strata uniformly and thus prevent visible surface damage (pages 11-2 through 11-4, Plate 6-1).

Subsidence is unlikely to damage or diminish the surface or ground water resources in this area. Subsidence that has occurred in the past at this mine and mines on nearby East Mountain has had no measurable effect on surface or ground water. The surface water resources consist only of ephemeral and intermittent streams. Even if subsidence were to displace or damage the channels of these streams, which is unlikely, water-borne sediment and natural sloughing would fill in the damage and the streams would circumvent and eventually overflow the damage. Ground water is unlikely to be affected because the thick sandstone strata in the area protect the local aquifers and because the strata which confine the aquifers are composed of clay minerals which swell when they become wet and thus seal the aquifers against water outflow (page 11-1).

The grazing land, timber, and wildlife habitat on Trail Mountain is also unlikely to be damaged by subsidence. As mentioned previously, longwall mining tends to lower the surface uniformly, with little or no fracturing. Thus, land and timber will be lowered as subsidence occurs, but they are very unlikely to be reduced in quality or quantity (page 11-1).

Subsidence has been monitored in the past at this site by monitoring the movement of permanent monuments with conventional surveying instruments. The permittee, however, will monitor subsidence by aerial photogrammetry. The permittee has done this, with very good results, at nearby mines. The elevation and coordinates of a given point are measured with a precision of ± 1 foot, and many, many more points are monitored than can be monitored using conventional surveying techniques. These data are used to plot subsidence isograms (contours) on a map. The result is a comprehensive and meaningful picture of subsidence which shows the size and shape of the subsidence trough and its relationship to the mine workings and surface topography (pages 11-2, 11-5).

Performance Standards for Subsidence Control

As discussed in the previous section, longwall mining is, by definition, a method of controlled subsidence. The permittee will control subsidence by removing as much of the minable coal as possible and by designing the barrier pillars that are left for entry protection to yield gradually and eventually crush out. This will result in the uniform lowering of the surface above the mined area, which will protect both the surface and the subsurface strata from fracturing (page 11-4).

The permittee will mitigate any significant subsidence damages. To the extent feasible, the permittee will restore those surface lands whose reasonably foreseeable use is reduced by subsidence to a condition in which they are again capable of sustaining that reasonably foreseeable use. The permittee will repair any roads, fences, stock ponds, or other structures to restore them to their pre-subsidence usefulness and replace any water source which is diminished as a result of the mining operation with water from another source (page 11-5).

All surface owner whose land may be affected by subsidence will receive a mining schedule. This schedule will detail the area in which mining is to take place and the planned date of the mining. A copy of this schedule will be included with the Annual Report (page 11-6).

Findings:

The plan fulfills the requirements of this section.

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:

Mine Workings Maps

Plate 3-2--Mining Plan and Plate 3-3--Areas of Coal Recovery show the anticipated timing and layout of entry development and of longwall panel development and mining, along with lease boundaries, the permit area boundary, and the location of the coal outcrop. Plate 3-3 also shows the coal reserve information found in Table 3-1. These maps were prepared and certified in 1995 by John Christensen, a professional engineer registered in the state of

Utah.

Findings:

The plan fulfills the requirements of this section.

FINDINGS/RECOMMENDATIONS

The permittee has substantially corrected, to the satisfaction of the Division, the first 2 permit defects listed in the Division Order. However, as discussed in **COAL RECOVERY** in the TA revision above, the Division cannot approve the response to the Division Order until the permittee has 1) obtained formal approval of the Resource Recovery and Protection Plan (R2P2) from the Bureau of Land Management (BLM), and 2) provided the Division with documentation of that approval.

cc: Daron Haddock
Pamela Grubaugh-Littig