



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

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March 8, 1995

R. Jay Marshall
Genwal Coal Company
P. O. Box 1201
Huntington, Utah 84528

Re: Longwall Amendment Deficiencies, Genwal Coal Company, Crandall Canyon Mine, ACT/015/032-95C, Folder #3, Emery County, Utah

Dear Mr. Marshall:

The Division has completed a review of the your proposed amendment to allow longwall mining at the Crandall Canyon Mine. Your amendment cannot be approved at this time due to the identified deficiencies. A copy of our technical analysis and findings is enclosed for your information and files. Please review it, paying particular attention to the requirement sections. Genwal must address the requirements before the amendment can be considered further. Please respond by April 10, 1995.

Since much of the land that this proposal effects is within the Forest Service boundary, we have sent a copy to the Forest Service for their input. We have yet to receive their comments and there may be additional requirements from the Forest Service. We will inform you as we are made aware of such.

Please call if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Daron R. Haddock".
Daron R. Haddock
Permit Supervisor

enclosure

cc: P. Grubaugh-Littig
W. Western
D. Darby
PFO

covlong.gen



TECHNICAL ANALYSIS LONGWALL MINING AMENDMENT

GENWAL COAL COMPANY
CRANDALL CANYON MINE
ACT/015/032-95C

March 6, 1995

OPERATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: UCA R645-301 (30 CFR Sec. 784.2, 784.11)

Analysis:

The Operator has updated the mining equipment list to the anticipated longwall system.

Findings:

The Operator has adequately addressed the requirement of R645-301-523.

COAL RECOVERY

Regulatory Reference: UCA R645-301-522 (30 CFR Sec. 817.59)

Analysis:

The Operator proposes using longwall mining methods. Plate 5-2 shows that longwall panels are proposed for both state and federal leases. The Division relies heavily on the BLM's recommendations about maximizing coal recovery upon federal leases. There is no mention in the PAP about the BLM's finding on maximizing coal recovery in the federal leases.

On state lease **ML-21568** the Division is the lead agency on maximizing coal recovery. There are two stream buffer zones in the state lease that prevent longwall panels from being fully developed. The Operator did not address how the coal that is unsuitable for

longwall mining will be recovered. The Division has determined additional coal recovery is possible by using room-and-pillar mining in the area unsuitable for longwall methods. In addition the Operator must state how the change to longwall mining will change the coal recovery in the state lease.

The Operator intends to mine only the Hiawatha coal seam. According to the State lease the Operator must up-drill into the Blind Canyon and Bear Canyon seams during the development phase of the Hiawatha seam. If the Blind Canyon or Bear Canyon seams are of minable thickness then the Operator must recover the upper coal before mining the Hiawatha seam.

John Blake, Sovereign Lands and Forestry, has reviewed the coal recovery plan and is concerned that the Operator has not included procedures for up-drilling into the Blind Canyon and Bear Canyon seams. John wants the Operator to recover coal in the Hiawatha seam that is not suitable for longwall mining but can be recovered using room-and-pillar methods.

Findings:

The Operator has not demonstrated that his mining plan will maximize coal recovery. The Division found that room-and-pillar mining can be used to recover coal in the Hiawatha seam that is not suitable for longwall techniques. The potential exists to recover coal from the two seams located above the Hiawatha seam. Information on those seams can only be obtained by up-drill during development of the Hiawatha seam. Should the upper seam have minable coal thicknesses then the Operator is required, by terms of the lease, to recover the coal.

Requirements:

1. The Operator must provide the Division with the BLM's findings that longwall mining will maximize coal recovery on the federal leases.
2. The Operator must provide the Division with information on how longwall mining will affect the amount of recoverable coal in the state lease.
3. The Operator must develop and implement recovery plans for coal not suitable for longwall mining.
4. The Operator must include plans to up-drill into the Blind Canyon and Bear Canyon seam and determine if those seams are minable. If they are minable then the Operator must recover the upper coal first.

SUBSIDENCE CONTROL PLAN

Regulatory Reference: UCA R645-301-525 (30 CFR Sec. 784.20, 817.121, 817.122)

Analysis:

The Operators list three references in Appendix 5-6 as the National Coal Board Handbook, The U.S. Bureau of Mines' 1988 subsidence study at the Deer Creek Mine and a finite element study by Mr. Sinha. Mr. Sinha's report was done using the boundary element method not finite element techniques. The text should be corrected to show that the study was done using the finite element method.

In the PAP, the Operator says that the maximum amount of vertical subsidence is expected to be 3.9 feet. That study was based on room-and-pillar methods with 80% of the coal in the panels recovered. Since longwall mining does not leave pillars the maximum anticipated subsidence could increase. Those calculations and corresponding text need to be updated to show the effects of longwall mining.

The Operator has relied heavily on his experiences and studies of full extraction using room-and-pillar methods to predict subsidence effects. There are differences between the room-and-pillar and the longwall that will influence subsidence effects. Those differences include panel width and leaving pillars.

The amount of subsidence varies with panel width. Room-and-pillar panels are 240 in width while longwall panels will be 800 feet. The assumptions used to predict maximum subsidence using room-and-pillar methods are not valid for longwall mining. Therefore, the Operator should recalculate the effect of subsidence.

There is no mention of the subsidence monitoring plan in the PAP or MRP. The Operator needs to consider the differences between room-and-pillar and longwall mining when developing a subsidence monitoring plan.

The Operator says that horizontal movement that would create a slope failure is not expected to occur due to subsidence along the escarpment, because only limited coal out crops occurs within the lease area. Pacific Corps studies of longwall mining effects on escarpment failure, suggest that failure be most likely to occur in tensional zones created by subsidence. Some mines in the area have had no escarpment failure while others have. The main concern with escarpment failure is damage to raptor nests. Since the Operators studies show no raptor nests in the area escarpment failure is not as critical an issue.

Findings:

The Operator needs to update his subsidence plan to incorporate the longwall mining methods. The proposed longwall mining methods are very different from the current room-and-pillar techniques. There has been no change to the subsidence plan to reflect those differences. Key points need to be addressed in the subsidence control plan.

Requirements:

1. The Operator must refer to the subsidence study done by Mr. Sinha as a finite boundary method not a finite element method.
2. The Operator must include the effects of longwall in all subsidence calculations. Including updating Plate 6-2, Maximum Limits of Possible Subsidence.
3. The Operator must update the subsidence monitoring program and include a copy or reference in the MRP.

MAPS, PLANS, AND CROSS SECTIONS

Regulatory Reference: UCA R645-301-512 and 521.100 (30 CFR Sec. 784.23)

Analysis:

Maps have been provided that show the geology, overburden thickness, coal isopachs, streams, springs, water monitoring sites, water rights, mine sequence, subsidence potential and lease boundaries.

Findings:

The maps and plans are adequate and sufficient to evaluate the proposed mine plan changes.

HYDROLOGIC INFORMATION

Regulatory Reference: UCA R645-301-730, 740, 750 (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)

Analysis:

The Operator plans to conduct longwall mining in federal Lease UTU-68082 and State Lease ML-21568, where room and pillar mining was planned before. Longwall mining impacts differ from room and pillar extraction mainly by the rates of extraction, the volume of extracted coal and the rates and extent of caving of the overburden rock. The extent of overburden caving (fracturing height) is sometimes difficult to predict and is related to stratigraphic profile and rock strength.

Currently, only a small amount of ground water is produced in the mine workings. Ground water interception caused by longwall mining is highly likely because caving and fracturing of the overburden will expose new conduits to drain connate water stored in the rock. Water production from these sources are usually temporary and can usually be handled with normal mine dewatering and storage methods. Subsidence fractures migrating upward can intercept aquifers or surface waters depending on the location of these water bearing sites and the amount and strength of the overburden separating the coal seam from the source. Generally, an overburden cover of 1,000 feet (it has been observed at other mine sites) is needed to protect the surface waters from fracturing that can intercept or displace surface water sources.

The Operator has provided a report by Earthfax Engineering, 1992 that evaluates the potential of fracture closures caused by subsidence. Results suggest that fractures from mining at Crandall Canyon Mine will be self sealing.

The Operator has provided spring, seep and stream monitoring data to establish baseline flows and annual fluctuation rates.

Findings:

The Operator has provided information to the best extent possible to anticipate the effects of subsidence on the hydrologic regime. Continued evaluation must be conducted during the mining process to determine any additional impacts.

Overburden thickness over most of the mine area is over 1000 feet thick. Three sites in the area proposed for longwall mining lie below 1000 feet of cover. The Operator has

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proposed not to longwall mine below the upper reaches of Crandall Creek and one of its southern tributaries. There is concern that subsidence could damage a perennial stream (93-175, on Plate 7-15) that has had surface water rights filed on it.

The area in the northwest corner of Federal Section UTU 68028 has coal less than 1000 feet below the surface and contains perennial flows with a water right. The springs in the vicinity have cover ranging between 850 and 900 feet. This amount of cover is within reasonable limits to allow longwall mining in the area.

Requirement:

1. The Operator must commit to assess and locate faults associated with the north-south trending Joe's Valley fault system via horizontal drilling, seismic analysis or other methods proposed by the Operator and acceptable to the Division, so that ground water interception from the fault does not occur.

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