



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

3482  
U-54762  
SL-062648  
(U-067)

Moab District  
San Rafael Resource Area  
900 North 700 East  
Price, Utah 84501

JAN 27 1989

**RECEIVED**  
JAN 30 1989

DIVISION OF  
OIL, GAS & MINING

Susan C. Linner, Permit Supervisor  
State of Utah  
Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

Dear Ms. Linner:

We have received and reviewed the "Five-Year Permit Renewal and New Lease Response, Genwal Coal Company, ACT/015/032," dated December 12, 1988. This package involves responses to reviews and deficiencies from the Forest Service and your agency. We have no comments on items regarding reclamation and post-mining land use, as the permit area is entirely inside the Manti-LaSal National Forest. The package does contain amendments to the initial resource recovery and protection plan (R2P2) for the new Federal coal lease U-54762. The BLM had determined that the R2P2 submitted on February 11, 1988, met the requirements of 43 CFR 3482.1(b) on June 17, 1988. Since that time, the Forest Service and your agency have expressed concern for escarpment failure along Huntington and Crandall Canyons induced by mining subsidence. A subsidence evaluation by your staff (Darby, Staff Report, October 1988) contends that development of mine workings under low overburden creates the potential for subsidence-induced fractures extending to or near the surface which could cause a slope failure and reduce the stability of the escarpments.

The purpose of this correspondence is to provide the BLM's determination as to whether the R2P2 provides for the protection of escarpments as required by the lease terms, and still safely achieves maximum economic recovery.

Genwal plans to room-and-pillar mine lease U-54762. Main entries would extend east off existing workings in the present permit area. Room-and-pillar panels would then be driven north across the township line into Section 32. The panels would be six entries on 80x80-foot centers, with north-south barrier

pillars of 80 feet between panels. Genwal plans to second mine panel pillars on retreat. Previous pillar mining by Genwal in their original permit area averaged between 50 and 80 percent extraction of the 60x60-foot pillars. Mining is planned to extend to within 50 feet of property boundaries and 200 feet from outcrops. Overburden on the property runs from 0 at the outcrop to 1,500 feet in the northwest corner of the new lease.

The BLM has concluded that Genwal's proposed R2P2 has sufficient outcrop coal barrier pillars designed to eliminate the potential for slope failure. Our conclusion is supported by the U. S. Bureau of Mines published report entitled "Stability of Mountain Slopes Undercut by Coal Mines, March 1983" which uses rock mechanic theory and analytical estimations to help in predicting slope failure. Using the geologic conditions at Genwal and applying the methodology of this report, we have calculated that an outcrop barrier pillar of 200 feet in width would provide a safety factor of 1.5 against slope failure.

The BLM believes slope failure will not occur. However, the classical subsidence theory indicates that some subsidence will occur. The amount of subsidence can be expressed as a function of the width of mine opening, depth of overburden, and thickness of seam extracted. In Genwal's case, subsidence could be expected to occur under 500 feet or less of overburden. The maximum amount of subsidence should be a percentage of the seam thickness. Genwal calculated a maximum subsidence of about three feet of the six feet of coal extracted under 500 feet overburden. We believe that with no slope failure due to the outcrop barrier pillar, subsidence above mine workings will appear only as ground lowering. Surface degradation from subsidence should not occur. Observations at the mine tend to support this conclusion. Genwal mined the 2nd and 3rd South panels off 1st West in 1984 and 1985. Both these panels were room-and-pillar mined, with the pillars pulled on retreat. The south limits of the panels mined within 250 feet of the outcrop in Crandall Canyon and to within 300 feet of overburden. Visual observations from BLM and Forest Service personnel and aerial photos taken before and after mining have not detected any slope failure, slumping, or surface cracks above the mined areas. The BLM believes the analysis of potential slope failure is valid and that Genwal should be allowed to second mine up to 200 feet from the outcrop.

Likewise, the Bureau has concluded that the proposed R2P2 will not cause escarpment failure. This conclusion is based on some observed geologic features and case histories of mines in the area with like geologic conditions. Prediction of cliff failures due to mining-induced subsidence under second mining room-and-pillar areas using classical stress strain failure modes is extremely difficult due to the nonhomogeneous relationships of rock strata. Classical rock mechanics and subsidence theory is hard to apply to escarpments due to the unknown competency of the strata rock near the cliff. However, we do have some relevant case histories of mines in the vicinity, with like mining and geologic conditions that can give us a firm justification in our recommendations to the mining plan.

Beaver Creek Coal Company, a subsidiary of Arco, Inc., operated the Huntington No. 4 Mine from 1977 to the last part of 1984. This mine is located in Mill Fork Canyon, 2 1/2 miles south of the Crandall Canyon Mine in Section 16, T. 16 S., R. 7 E., SLB&M.

The escarpment over this mine has areas of 200- to 300-foot vertical cliffs, whereas, at the Genwal Mine, the maximum of vertical cliff relief is less than 100 feet. Beaver Creek extracted the Blind Canyon seam with room-and-pillar mining under much of the cliff area in Mill Fork Canyon. The seam height was five to seven feet and much of the development areas were second mined. Aerial photos and observations from the Forest Service and Price BLM individuals have shown no failure or surface manifestations above any of the Huntington No. 4 workings.

Another mine in the area, the Trail Canyon Mine, Co-op Mining Company operator, has done extensive mining under cliffs and has not subsided the cliffs. This mine pulled extensive blocks of coal up to ten feet thick which, according to mine maps in our possession, nearly extracted the entire seam in the NW1/4 of Section 26, T. 16 S., R. 7 E., SLB&M. Again, no observable cliff failure has occurred.

Finally, Genwal has mined the 1st, 2nd and 3rd West panels in the original permit area. These panels were mined with room-and-pillar methods, with pillar extraction on retreat. The 3rd West and part of the 2nd West panels mined under the Castlegate cliffs in the NE1/4 of the NW1/4, Section 6, T. 16 S., R. 7 E., SLB&M. Recent aerial photos were compared with photos before mining. No detectable failure or cliff spalling were noticed. Observations by mine personnel and Forest Service personnel could not find any signs of subsidence.

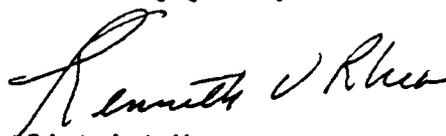
In summary, we conclude that the R2P2, as proposed by Genwal, will protect surface resources from damage due to mining-induced subsidence. This recommendation is contingent upon close subsidence and cliff monitoring. Should signs of failure appear, the mining can be limited to first mining, as Genwal has calculated adequate pillar strength against failure. We suggest establishing prism locations on the cliffs to monitor any movement. Ideal locations would be near the north section line on the NE1/4 of the NW1/4, Section 5, T. 16 S., R. 7 E., SLB&M. Monitoring should detect any preliminary movement on the escarpment.

The alternative for escarpment protection is to leave more coal unmined and sterilized. If Genwal has to first mine only under 500-foot cover, we calculate that approximately 260,000 tons of coal that would have been recovered with second mining would not be recovered and lost. Under the proposed mining plan, we conclude by the above-mentioned items that the risk of subsidence damage is minimal. To reduce a minimal risk by leaving more coal is an unwarranted loss of the coal resource.

We hereby reaffirm that the R2P2 meets the requirements of all applicable laws and recommend that the permit application and renewal be granted.

Please contact Brent Northrup of my staff or Stephen Falk in our San Rafael Resource Area office in Price if we can be of further assistance.

Sincerely yours,

  
District Manager

cc: Genwal Coal Company  
Manti-LaSal National Forest, Price, Utah  
SD, Utah (U-921)

ACTING



United States Department of the Interior

FISH AND WILDLIFE SERVICE  
FISH AND WILDLIFE ENHANCEMENT  
UTAH STATE OFFICE  
2078 ADMINISTRATION BUILDING  
1745 WEST 1700 SOUTH  
SALT LAKE CITY, UTAH 84104-5110



In Reply Refer To

(FWE)

April 6, 1989

MEMORANDUM

TO: Chief, Biological Sciences Branch, Office of Surface Mining,  
Denver, Colorado

FROM: State Supervisor, Fish and Wildlife Enhancement, Fish and Wildlife  
Service, Salt Lake City, Utah

SUBJECT: Section 7 Consultation, Crandall Canyon Mine, Carbon County, Utah

WESTERN FIELD OPERATIONS  
608 APR 10 10 41 AM 87  
OSMRE-WFO

This responds to your memorandum of March 21, 1989, describing a proposed modification of the mining plan for the subject mine. According to your impact assessment, no new surface disturbance or additional water depletion will occur as a result of the proposed modification. Therefore, the U.S. Fish and Wildlife Service concurs with your determination of no effect to threatened and endangered species.

No further consultation according to Section 7 of the Endangered Species Act of 1973, as amended, is required. Your interest in conserving endangered species is appreciated.

*Robert A. Russink*



Norman H. Bangertér  
Governor  
Max J. Evans  
Director

Division of State History  
(Utah State Historical Society)  
Department of Community and Economic Development

300 Rio Grande  
Salt Lake City, Utah 84101-1182  
801-533-5755

OSMRE-WFO

1989 MAY -1 AM 9:28

April 27, 1989

WESTERN FIELD OPERATIONS

Robert Schueneman, Chief  
Office of Survey Mining  
Reclamation and Enforcement  
Brooks Towers  
1020 15th Street  
Denver, Colorado 80202

RE: Permit Application Concerning Expansion of the Crandall Canyon Mine,  
Carbon County, Utah (U-54762)

In Reply Please Refer to Case No. J885

Dear Mr. Schueneman:

The Utah State Historic Preservation Office received your letter on the above referenced project on April 24, 1989. We previously consulted with the Forest Service and the Division of Oil, Gas, and Mining on this project and concurred that there were no known historic properties that would be impacted by this project. A 10% survey of the areas most likely to contain archaeological and historic resources was conducted and the remaining areas were found not likely to contain cultural resources.

We agree with your recommendation for the potential discovery of previously unknown cultural resources in that your office, the Division of Oil, Gas, and Mining, and our office will be notified. The discovered site will be protected, evaluated and mitigation measures instigated, if necessary.

We also agree with your recommendation that no known historic properties will be impacted by the project. This information is provided on request to assist the Office of Surface Mining with its Section 106 responsibilities as specified in 36 CFR 800. If you have questions or need additional assistance, please contact me at (801) 533-7039.

Sincerely,

Diana Christensen  
Regulation Assistance Coordinator

DC:J885/6897V OFR/NP

c: Ms. Susan Linner, Division of Oil, Gas and Mining, Salt Lake City, Utah  
Mr. Les Wikle, Manti-LaSal National Forest, Monticello, Utah





# United States Department of the Interior

OFFICE OF SURFACE MINING  
RECLAMATION AND ENFORCEMENT  
BROOKS TOWERS  
1020 15TH STREET  
DENVER, COLORADO 80202



In Reply Refer To:

April 14, 1989

## MEMORANDUM

TO: Chief, Federal Lands Branch

THROUGH: Chief, Biological Sciences Branch *Robert Schuenemann*

FROM: Foster Kirby, Archaeologist  
Resource Protection Section *Foster Kirby*

SUBJECT: Genwal Coal Company, Crandall Canyon Mine (UT 0067)  
Cultural Resources Review for the Addition of a New  
Federal Lease to the Approved Permit Area.

The company proposes to add an additional underground lease to its currently permitted permit area. The new lease contains 256.49 acres under the control of the U.S. Forest Service, Manti-LaSal Forest. No additional surface disturbance is planned. Mining will be conducted using room and pillar methods.

The surface disturbance area associated with the previous permit has been completely surveyed. No archaeological sites were located in the portal or facilities area; however, a rockshelter found eligible for nomination to the National Register (42 EM 722) was located near the haul road. The site has been fenced by the company and will be protected. A new tract of land was added in 1987 (tract 2) but involved no new surface disturbance.

The proposed mine plan modification, located to the north and northeast of the existing permitted area, has received archaeological clearance based on consultations between the U.S. Forest Service and the State Historic Preservation Officer (SHPO). The letter from the SHPO is attached and was used by the State in their permitting document. The SHPO indicates that it agrees with the Forest Service that the probability of locating cultural resources within the lease area is very low.

We are writing a follow-up letter to the SHPO requesting a "no effect" finding for the proposed mine expansion. This will supplement the SHPO/Forest Service letter and complete this action.

Attachment

United States  
Department of  
Agriculture

Forest  
Service

Manti-LaSal  
National Forest

599 West Price River Dr.  
Price, Utah 84501

Reply to: 2820

Date: May 23, 1989

Richard Holbrook  
Office of Surface Mining  
Reclamation and Enforcement  
Brooks Towers  
1020 15th. Street  
Denver, Colorado 80202

RE: New Lease, Genwal Coal Company, Crandall Canyon Mine, ACT/015/032, Folder #2, Esery County, Utah

Dear Mr. Holbrook:

We received a copy of Utah Division of Oil, Gas and Mining's Draft Decision Document and Technical Analysis for the addition of Federal Coal Lease U-54762 into the Crandall Canyon Mine Permit Area on May 16, 1989. We did not receive a copy of the draft of final Decision Document and Technical Analysis for review prior to transmittal of the approval package to your office for action.

As discussed with Aaron Howe on May 22, we have reviewed the Draft Decision Document and Technical Analysis and do not feel that the Division adequately addressed our concern regarding protection of escarpments in the lease area in Stipulation No. 1, UMC 817.121. Please reference our letter dated February 9, 1989, which was attached to the Division's State Decision Document and Technical Analysis.

The stipulation requires quarterly visual inspections of areas where mining has taken place beneath the escarpments which face or are visible from Huntington Canyon for a period of two years following developmental mining and again after recovery mining. Even though the escarpment in Huntington Canyon is of primary concern, we are also concerned about potential mining induced escarpment failure on the lease in Crandall Canyon. Mining induced escarpment failures in Crandall Canyon would indicate that failures could also be induced by recovery mining under similar conditions in Huntington Canyon. The stipulation should not be limited to Huntington Canyon and should require visual inspections on a more frequent basis (weekly) during the time that recovery mining under the escarpments is conducted.

The stipulation requires the operator to commit to notifying the Regulatory Authority within a period of 30 days if any subsidence or escarpment failure occurs on the permit area. This is not satisfactory. Upon discovery of an escarpment failure, the operator should be required to cease pillar recovery

operations and immediately notify the Regulatory Authority. If the Regulatory Authority, BLM and the Forest Service determine that continued pillar recovery could result in significant resource damage, the operator will be required to cease recovery mining under the escarpment until an acceptable mitigation plan can be developed and/or continued pillar recovery in the escarpment area is specifically approved.

We suggest that the stipulation be revised to read as follows:

"The applicant will be required to conduct quarterly visual subsidence/escarpment failure surveys of the areas where mining has taken place beneath escarpment areas visible from Huntington and Crandall Canyons for a period of two years following development mining and again after recovery mining. The survey results shall be recorded and submitted to the Regulatory Authority no more than 30 days following the survey. During recovery mining operations under the escarpments, the frequency of visual surveys shall be increased to weekly intervals. In the event that escarpment failures occur above pillar recovery areas, the operator shall immediately cease pillar recovery under escarpments and notify the Regulatory Authority. Pillar recovery operations in the escarpment areas may not proceed until specifically approved by the Regulatory authority ~~in~~ <sup>with</sup> ~~consultation with~~ the BLM and Forest Service." <sup>the consent of</sup>

*Change per  
Telephone Conv.  
5/24/89 RWH*

We consent to the addition of the new lease into the permit area subject to the incorporation of the above revised stipulation or a mutually acceptable alternative. If you have any questions, please contact Aaron Howe or Carter Reed at our Forest Supervisor's Office in Price, Utah.

Sincerely,



for  
GEORGE A. MORRIS  
Forest Supervisor

cc:  
Division of Oil, Gas and Mining

Muir file  
S. Linna

United States  
Department of  
Agriculture

Forest  
Service

Manti-LaSal  
National Forest

599 West Price River Dr.  
Price, Utah 84501

Reply to: 2820

Date: February 9, 1989

**RECEIVED**  
FEB 13 1989

Lowell Braxton  
State of Utah Natural Resources  
Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

DIVISION OF  
OIL, GAS & MINING

RE: Five-Year Permit Renewal and New Lease Response, Genwal Coal Company,  
ACT/015/032, Emery County, Utah

Dear Lowell:

We have reviewed the Bureau of Land Management's letter to your office, dated January 27, 1989, which discusses their evaluation of the Resource Recovery and Protection Plan (R2P2) and escarpment protection. The evaluation was in response to review of the Five-Year Permit/New Lease Application and deficiencies identified by the Forest Service and the Utah Division of Oil, Gas and Mining.

The Forest Service determined that mining induced slope/escarpment failures in Huntington Canyon would not be acceptable due to the sensitive nature of resource values and management objectives for the area. The Huntington Canyon corridor is a high use access route (State Highway 31) and recreation area. Huntington Creek is an important, high quality fishery. The visual quality objective for the canyon area which can be viewed from State Highway 31, is Partial Retention. This means that the area will be managed to provide natural appearing scenery in the foreground and middleground as viewed from the canyon bottom and slopes. Any exception to Special Coal Lease Stipulation #13, which requires that mining be conducted in such a manner as to prevent surface subsidence that would cause escarpment failure and landslides, will not be considered for this lease.

In their letter, the Bureau stated that escarpment/slope failure should not be induced by mining as approved in the R2P2. They used rock mechanics theory and analytical estimations supported by the U.S. Bureau of Mines published report entitled "Stability of Mountain Slopes Undercut by Coal Mines, March 1983" to calculate that the 200' barrier pillar would provide a safety factor of 1.5 against slope failure. In addition to the calculations, the Bureau used empirical data based on field observations and aerial photographs to verify that similar mining operations in the area have extracted pillars under similar

slopes and have not caused escarpment/slope failures. We agree that based on present available empirical data and theoretical methods presented in the Bureau's determination, the probability of inducing escarpment/slope failure in Huntington Canyon is low.

The uncertainties which become obvious, however, involve the accuracy of theoretical calculations considering the complexities of evaluating nonhomogeneous rock materials, the lack of data regarding the extent to which subsidence has progressed in the mines used for comparison, and the possible north-west trending fault on the eastern portion of the lease.

In their letter, the Bureau recommended close subsidence and cliff monitoring, which would include installation of EDM prisms on the slope. In addition to monitoring, they stated that if signs of failure appear during pillar extraction, operations in the remaining areas under the escarpment could be limited to first mining. After discussing the approved R2P2 with the Bureau, we do not feel that installation of the prisms would provide the necessary warning that escarpment/slope failure will occur prior to an actual failure. Frequent inspections of the area during recovery mining and Genwal Coal Company's photogrammetric subsidence monitoring plan should, however, provide adequate detection of failures.

Considering the above information, we consent to second mining in the area under the escarpment/slope which involves less than 500 feet of overburden (up to 200 feet of the coal outcrop) as approved in the R2P2 and proposed in the Mining and Reclamation Plan. Our consent is, however, conditional upon the provisions that the escarpment areas will be inspected frequently during and after recovery mining and that recovery mining will be discontinued in areas with less than 500 feet of overburden, in the event that mining induced failures occur.

If you have any questions, please contact the Forest Supervisor's Office in Price, Utah.

Sincerely,



for  
GEORGE A. MORRIS  
Forest Supervisor