

ENVIRONMENTAL ASSESSMENT
Crandall Canyon Mine
Mining Plan
Federal Leases U-54762 and SL-062648
April 1989

I. PROPOSED ACTION AND ALTERNATIVES

A. Purpose and Need for a Federal Action

The Office of Surface Mining Reclamation and Enforcement (OSMRE) received on February 26, 1988, a permit application package (PAP) proposing the mining of leased Federal coal at the Genwal Coal Company, Inc. (Genwal) Crandall Canyon mine. OSMRE reviewed the PAP and determined that the proposed operations required a mining plan approval by the Assistant Secretary--Land and Minerals Management pursuant to the Mineral Leasing Act of 1920 and 30 CFR Part 746. This document assesses the effects of the proposed mining and reclamation operations and if approval, approval with conditions, or disapproval by the Assistant Secretary will have a significant impact on the human environment.

B. Background

The Crandall Canyon mine is located in Emery County, Utah, approximately 13 miles northwest of Huntington, Utah. The existing permit area contains 160 acres of which all is Federally owned except for 2 privately owned acres. The underground mine utilizes room and pillar methods with full pillar extraction during retreat mining. Approximately 10 acres have been affected by the surface disturbance to date. The premining uses have been dispersed undeveloped recreation, and migrating and grazing by native big game species. Genwal plans for the area to return to these uses after mining has been completed. The Hiawatha coal seam is being mined at a rate of 360,000 tons per year. Mining is expected to continue until 1990 under Utah permit ACT/015/032 and the approved mining plan. The Crandall Canyon mine mining plan was originally approved under the Federal lands program in November of 1982. Since that approval, there has been one modification to the Crandall Canyon mine mining plan approved on February 11, 1987.

C. Description of the Current Proposal

Genwal Coal Company (Genwal) has proposed to add Federal lease U-54762 to the permit area for the underground Crandall Canyon Mine. The new lease will be mined as an extension of the mine's current room and pillar operations.

The operation will continue mining the Hiawatha coal seam. The new lease contains 257 acres and has approximately 2.5 million tons of coal, of which 1.5 million tons are recoverable. With this lease addition, the Crandall Canyon Mine mining plan area will contain a total of 411 acres, including the previously approved mining plan area for Federal lease SL-062648 and this proposed mining plan area for Federal lease U-54762.

No additional surface construction or facilities is planned with this proposal. There is no change in employment anticipated with the addition of the new lease. With the approval of the mining plan, the life-of-the-mine is extended to 6 years ending in 1995, with an average annual production of 360,000 tons per year. Post mining land plan for the area is to return to premining uses.

Utah Department of Oil, Gas, & Mining (DOGM) reviewed the PAP under the Utah State program and the Utah cooperative agreement (30 CFR 944.30) In its approval of the PAP on March 7, 1989, Utah DOGM required special conditions in Utah permit ACT/015/032 to ensure compliance with the Utah State program. (See State's Technical Analysis)

D. Previous Environmental Studies

Environmental studies prepared for the Crandall Canyon mine and surrounding general area include:

1982, OSMRE, Environmental Assessment, Crandall Canyon Mine.

1983, USFS, Environmental Assessment, Modification of Federal Coal Lease SL-062648.

1989, Utah's DOGM, State Decision Document and Technical Analysis, New Lease, Crandall Canyon Mine.

On March 10, 1989, Utah DOGM submitted to OSMRE its final State Decision Document & Technical Analysis for its approval of the PAP pursuant to the Utah State program and cooperative agreement. In accordance with the Utah cooperative agreement and the guidelines of the Council on Environmental Quality, Utah DOGM's State Decision Document & Technical Analysis contains the state's analysis of environmental impacts of the proposed operations to assist OSMRE in the preparation of this Environmental Assessment. OSMRE has reviewed UTAH DOGM's State Decision Document & Technical Analysis and concurs with the analysis and conclusions contained therein.

II. ALTERNATIVES

A. Alternatives Under Analysis

Approval With Special Federal Conditions

The Assistant Secretary--Land and Minerals Management would approve the mining plan with special Federal conditions to mitigate impacts or to satisfy the requirements of Federal laws, Executive orders, and regulations. Such conditions would be in addition to any special conditions of approval of the permit application by Utah DOGM. This is the preferred alternative.

Disapproval

The Assistant Secretary--Land and Minerals Management would disapprove the mining plan which would have the same effect as taking no action.

B. Alternative Considered but not Analyzed Further

No Action

Under 30 CFR 746.14, mining plans must be approved, approved with conditions, or disapproved by the Assistant Secretary. The Assistant Secretary must act on the proposed mining plan; therefore, the No Action alternative is not discussed further in this document. However, taking no action would have the same effect as disapproval.

Approval Without Special Federal Conditions

The Assistant Secretary would approve the mining plan without any special Federal conditions. However, special Federal conditions are required for approval to ensure compliance with the Federal lease, the Federal lands program, and the USDA Forest Service laws and regulations. Without these conditions, the mining plan could not be approved.

Technical Alternative

There are no conflicts in the uses of the available resources; therefore, there is no need for technical alternatives.

III. AFFECTED ENVIRONMENT

Descriptions of the affected environment within its resource setting are contained in the following earlier-prepared documents:

Utah DOGM's State Decision Document & Technical Analysis
(pages 1-8)

1982, OSMRE, Environmental Assessment, Crandall Canyon Mine

1983, USFS, Environmental Assessment, Modification of Federal Coal Lease SL-062648

1989, Utah's DOGM State Decision Document and Technical Analysis, New Lease, Crandall Canyon Mine

The environmental resources of the area to be affected by the current proposal are similar to the resources found in the areas described in the documents listed above. These documents are incorporated by reference. The description of the affected environment is summarized below.

Genwal Coal Company's Crandall Canyon Mine is located along the eastern margin of the Wasatch Plateau Coal Field approximately 15 miles west of Huntington, Utah. The eastern margin of the Wasatch Plateau forms a rugged escarpment that overlooks Castle Valley and the San Rafael Swell to the east. Elevations along the eastern escarpment of the Wasatch Plateau range from approximately 6,500 to over 9,000 feet.

The formations exposed in the Wasatch Plateau are Tertiary and Cretaceous-aged sedimentary units. These formations are principally composed of shale and sandstone. Siltstone, mudstone and limestone occur in lesser amounts. The formations in the Wasatch Plateau area generally dip one to three degrees westward off the west flank of the San Rafael Swell. Regional dips are interrupted by principally east trending fold axes, and principally north trending fault axes.

Stratigraphic units outcropping within the study area include, from oldest to youngest, the Masuk Shale Member of the Mancos Shale, Starpoint Sandstone, Blackhawk Formation, Castlegate Sandstone, Price River Formation, North Horn Formation and Quaternary deposits.

The Hiawatha Coal Seam, which is the coal seam to be mined in the new lease area, occurs at the base of the Blackhawk Formation. The Hiawatha Coal seam has been mined in the Tract 1 and Tract 2 areas and is exposed at an approximate elevation of 7900 feet. Maximum overburden is approximately 1500 feet in the northwest corner of the Tract 2 Lease with an average overburden of approximately 800-900 feet. The entire permit area is underlain by the Starpoint Sandstone.

Precipitation varies from 40 inches at higher elevations to less than 10 inches at lower elevations. The Wasatch may be classified as semiarid to subhumid.

Vegetation varies from the Sagebrush/Grass community type at lower elevations to the Douglas Fir/Aspen community at higher elevations. Other vegetation communities include Mountain Brush, Pinyon-Juniper, Pinyon-Juniper/Sagebrush and Riparian. These communities are primarily used for wildlife habitat and livestock grazing.

Crandall Canyon Creek which flows past the Crandall Canyon Mine is a perennial tributary to Huntington Creek which is a tributary to the San Rafael River. The upper drainage of Huntington Creek encompasses about 200 square miles of mountainous country in the Wasatch Plateau. About 90 percent of the area is higher than 8000 feet. The average channel gradient along Huntington Creek is about 100 feet per mile. The lower reaches of the tributaries to Huntington Creek typically have surface relief between the stream channels and tops of adjacent canyon walls of 2,000 feet or more.

A. Ground Water

The ground water regime is dependent upon geologic and climatic parameters that establish systems of recharge, movement and discharge.

Snowmelt at higher elevations provided most of the ground water recharge, particularly where permeable lithologies or faults/fractures are exposed at the surface. Vertical migration of ground water occurs through permeable rock units and/or along zones of faulting and fracturing. Lateral migration initiates when ground water encounters impermeable rocks and continues until either the land surface is intersected (and spring discharge occurs) or other permeable lithologies or zones are encountered that allow further vertical flow.

Six formations outcrop in and adjacent to the mine area. The Masuk Shale Member of the Mancos Shale is a light gray to blue-gray marine sandy shale in the mine vicinity. This unit is exposed at the mouth of Crandall Canyon and in adjacent areas along Huntington Creek. The Masuk Shale Member yields water locally to seeps and springs but does not serve as a regionally important aquifer.

The Star Point Sandstone is predominantly a light gray massive sandstone with minor interbedded layers of shale and siltstone near its base. In the vicinity of the mine the Star Point Sandstone is approximately 300 feet thick. The

Star Point serves as an important regional aquifer yielding water to several minor and some major springs where fractured and jointed.

The Blackhawk Formation is the principal coal-bearing unit in the region. This formation consists of interbedded layers of sandstone, siltstone, shale, and coal, all of marine origin. The Blackhawk is approximately 700 feet thick in the mine area, with the principal coal seam (the Hiawatha seam) occurring near the bottom of the formation. The formation yields water to springs and coal mines when fractured. Where it is locally interbedded with the Star Point Sandstone, the lower portion of the Blackhawk Formation is considered an aquifer.

The Castlegate Sandstone overlies the Blackhawk Formation and consists of tan to brown cliff-forming sandstones of fluvial origin. The sandstones are massive and medium-to coarse-grained. In the area of the mine, the Castlegate yields water locally to seeps and springs but does not serve as an important regional aquifer because it is commonly drained within short distances from its recharge area due to deeply incised canyons.

The Price River Formation consists predominantly of friable limey sandstone interbedded with pebbly conglomerates and shales. It forms steep receding slopes and reaches a maximum thickness of about 500 feet in the mine area. This formation yields water locally to seeps and springs. However, like the Castlegate Sandstone, deeply incised canyons in the area prevent the Price River Formation from being an important regional aquifer.

The uppermost formation that outcrops within the area adjacent to the mine plan area is the North Horn Formation. This formation consists of interbedded limestones, sandstones, and shales. Due to high topographic presence, the North Horn Formation serves primarily as a recharge unit to underlying formations rather than as an important source of water itself.

Most, if not all, ground water in the region is derived from snowmelt. Recharge tends to be limited in areas underlain by the Price River Formation and older rocks (relative to recharge in areas underlain by younger rocks) due to slope steepness and relative imperviousness (both of which promote runoff rather than infiltration of snowmelt).

Ground water inflow to the existing underground workings amounts to approximately 100 gallons per minute. The inflow is currently being used in the mining process.

The predominant chemical constituents in most springs in the region are calcium and bicarbonate. Dissolved solids concentrations generally range from about 50 to 750 milligrams per liter. Regionally, the concentrations of major dissolved constituents in water from individual geologic units is highly variable, due to the complex lithologic nature of the area.

B. Surface Water

Crandall Canyon Creek is an east-flowing tributary of Huntington Creek, one of the major tributaries of the San Rafael River.

Huntington Creek had annual flows near Huntington ranging from 25,000 to 150,000 acre-feet during the period of October 1931 through September 1973, averaging 65,000 acre-feet per year.

Approximately 50 to 70 percent of streamflow in the mountain streams of the region occurs during May through July. Streamflow during this late spring/early summer period is the result of snowmelt runoff. Such seasonal variations are common for streams in the area.

The quality of water in Huntington Creek and other similar streams in the area varies significantly with distance downstream from the minesite. Concentrations of dissolved solids varied from 125 to 375 milligrams per liter in reaches above major diversions to 1600 to 4025 milligrams per liter in reaches below major irrigation diversions and populations centers. The major ions at the upper sites were found to be calcium, magnesium, and bicarbonate, whereas sodium and sulfate became more dominant at the lower sites. These changes attributed to (1) diversion of water containing low dissolved solids concentrations, (2) subsequent irrigation and return drainage from moderate to highly saline soils, (3) groundwater seepage, and (4) inflow of sewage and pollutants from populations centers.

Average annual sediment yields within the Huntington Creek drainage basin range from approximately 0.1 acre-feet per square mile in the headwaters area to about 3.0 acre-feet per square mile near the confluence with the San Rafael River. Increases in sediment yield with increasing distance downstream is generally the result of increasing amounts of shale and sandstone in the downstream direction.

Surface water quality data collected from Crandall Creek by Genwal for the Tract 1 Lease from 1985 indicate that the dominant ions in Crandall Creek are calcium and bicarbonate. Total dissolved solids concentrations in the stream have

varied from 180 to 286 milligrams per liter, with lower concentrations normally occurring during the high flow season. Total suspended solids concentrations in Crandall Creek have varied during the period of record from 0.5 to 208 milligrams per liter. As expected, the highest suspended solids concentrations generally occur during periods of highest flow.

C. Visual Quality

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 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.

IV. IMPACTS OF ALTERNATIVES

A. Impacts of Approval With Special Federal Conditions

Description of the impacts of the mining and reclamation operations as approved by Utah DOGM is contained in Utah DOGM's State Decision Document & Technical Analysis. The impacts of approval of the mining plan with special condition are summarized below.

1. Ground Water

Dewatering and subsidence related to mining have the greatest potential for impacting ground water resources in the area.

a. Dewatering

Inflow into the existing underground workings amounts to approximately 100 gallons per minute. These inflows originate primarily in sections near the working face of the mine. Currently, water encountered in the mine is used underground in the mining process. Continued interception of mine inflow may potentially dewater certain localized aquifers not only during the first five year permit term but also throughout the life-of-mine as the workings are further developed.

b. Subsidence

Subsidence impacts are largely related to extension and expansion of the existing fracture system and upward propagation of new fractures. Inasmuch as vertical and lateral migration of water appears to be largely controlled by fracture conduits, readjustment or realignment in the conduit system may potentially produce changes in the configuration of ground-water flow. Potential changes include increased flow rates along fractures that have "opened" and diverting flow along new fractures or permeable lithologies. Subsurface flow diversions may cause the depletion of water in certain localized aquifers, whereas increased flow rates along fractures would reduce ground-water residence time and potentially improve water quality.

Therefore, mining may dewater certain localized aquifers and affect flow rates along existing or new subsidence related fractures. However, these impacts will be localized near the mine permit area. No other ground water disturbances exist within the permit area and cumulative hydrologic impacts are not expected. The impact is expected to be long term and minor.

2. Surface Water

The main concern in terms of impacts to surface water is water quality deterioration downstream from the mine site, primarily in the form of suspended sediments. Typically the suspended sediment concentration in Crandall Canyon Creek since 1983 varied from approximately 205 mg/l to 0.5 mg/l. The low suspended sediment values are associated with natural climatic and geologic processes although a proportion may be attributed to surface disturbances from roads and the mine pad area. Sediment controls do exist for the disturbed surface areas. Therefore, the impact associated with mining in Crandall Canyon is minimized by surface controls (i.e., sediment pond, diversions, etc.). No other surface disturbances due to mining occur within the permit area and therefore cumulative hydrologic impacts are not expected. The impact is expected to be short term and minor.

3. Other Surface Resources

Some subsidence is expected to occur. It will be ground lowering of up to 3 feet as the overburden decreases to 500 feet. This will result in some cracks or fractures in the overburden. Although escarpment failure is possible, it is not expected, and frequent monitoring of the area by the company is required as a precaution. Surface resources

should be affected minimally. Therefore, the impact of subsidence is expected to be long term and minor.

4. Visual Quality

There is a possibility of escarpment/slope failure as a result of the proposed mining. Bureau of Land Management evaluated this concern and decided that failure should not occur as a result of mining. Since the USDA Forest Service has determined that any mining-induced escarpment/slope failures in Huntington Canyon would be unacceptable (because of the sensitive nature of resource values and management objectives for the area), the USDA Forest Service has requested a Federal stipulation for monitoring and protecting the areas where mining occurs under the escarpments. If failure occurs, the operator must cease mining operations under the escarpment until further notice is given by Utah DOGM.

The failures could be viewed from a heavily-used highway and from recreation users in the area. This Federal stipulation requiring frequent monitoring should mitigate the possible adverse visual impacts if failure should occur.

5. Irreversible and Irrecoverable Commitments

The approval of this mining plan modification will result in the removal of 1.5 million tons of coal and loss of 1 million tons of recoverable coal.

B. Impacts of Disapproval

If the mining plan is disapproved, the impacts described above for the "Approval With Special Federal Conditions" alternative would not occur. The Crandall Canyon mine would continue to operate under the terms and conditions of the previously approved mining plan, the impacts of which were described in the 1982 OSMRE Environmental Assessment. Disapproval would result in 1.5 million additional tons of Federal coal not being mined unless and until an alternative mining plan is developed, submitted by the lessee, and approved by the Assistant Secretary.

IV. CONSULTATION AND COORDINATION

A. Preparers

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B. Consultations

The following individuals were consulted in the preparation of this EA:

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