

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Soldier Creek Coal Company
Banning Loadout
ACT/007/034
Carbon County, Utah

September 29, 1988

Introduction

This is a Cumulative Hydrologic Impact Assessment (CHIA) for Soldier Creek Coal Company's Banning Loadout in Carbon County, Utah. Soldier Creek Coal Company is a subsidiary of Sun Corporation Inc. This assessment analyses the probable cumulative impacts of coal mining, coal storage and coal shipping in the general area and whether the operations proposed under the application have been designed to prevent damage to the hydrologic regime outside the permitted area. This report complies with federal legislation passed under the Surface Mining Control and Reclamation Act (SMCRA) and subsequent Utah and federal regulatory programs under UMC 786.19(c) and 30 CFR 784.14(f).

The loadout is located south of U.S. Highway 6-50 near Sunnyside Junction, Utah (Figure 2). The Banning Loadout will receive, stockpile and load coal that is mined at the Soldier Creek Mine approximately 19 miles northeast of the loadout (Figure 1 and 3). The permit will comprise approximately 36 acres of private, state, and federal (managed by the U.S. Bureau of Land Management (BLM)) land within Section 15 of T15S., R12E.(Figure 2). Approximately 21.4 acres of the disturbed area will be used for long term storage of coal, as economic conditions dictate.

The permit area is located in Clark Valley between the Book Cliffs escarpment and Cedar Mountain, which lies at the northern end of the San Rafael Swell. This area has been designated as the Mancos Shale Lowlands, a physiographic subdivision by Stokes (1986, Page 232, Map 43), delineated by the desert floor of Castle Valley, Clark Valley and Grand Valley. The lowlands are shaped by a few perennial streams and a great number of intermittent and ephemeral washes. The topography reflects an erosive surface with pediments, rugged badlands and narrow flat-bottomed alluvial valleys.

No oil or gas wells are located within the existing permit area or adjacent areas. The closest wells are located in Sections 18 and 19. These are gas wells operated by Equity Oil Company.

There are no designated prime farmlands or alluvial valley floors in or adjacent to the permit area. No farming has occurred in the past or currently takes place in the vicinity of the permit area.

II. Cumulative Impact Area (CIA)

Figure 2 delineates the CIA for the Banning Siding Loadout. The CIA comprises 167 acres. Elevation of the site is about 5,500 feet above mean sea level.

III. Scope of Operation

The loadout began operation during June of 1976. Coal is hauled to the loadout by double trailer trucks. The coal is then crushed to size and stored at a radial stacker until shipped by rail. The operation currently processes 3,000 tons per hour. Future plans are to increase the loading capacity to 6,000 tons per hour to make the site capable of handling unit trains.

IV. Study Area

A. Geology

The Banning Loadout is constructed on Mancos Shale. The Mancos Shale is generally a thick unit of varying shades and hues of gray carbonaceous and gypsiferous material. It ranges from a fine clay to siltstone. It is nodular or massive in its fresh surface appearance and decrepitates to a soft semi-sterile soil. Precipitation leaches the chemical matter from the shale to form white patches of efflorescences of alkali. Where protected by sandstone units, the Mancos shale units form pinnacles and knolls.

According to information garnered from Equity Oil Company's Mounds 3-A Carbon-dioxide well located in Section 18 of T15S, R12E, the Mancos Shale is approximately 420 feet thick below the surface at the loadout. Underlying the Mancos Shale is the Dakota Sandstone, Ceder Mountain Formation., Buckhorn Formation and pre-Cretaceous formations.

The formations that lie stratigraphically above the Mancos Shale can be seen outcropping in the escarpment of the Bookcliffs about nine miles to the north and east. The Bookcliffs are formed from the more resistant Mesa Verde Group of late Cretaceous age and the Northhorn Formation and Flagstaff Limestone of Tertiary age (see Figure 4).

The mineable coal seams in the vicinity of the Banning Loadout facility exist in the Blackhawk Formation. The closest mines in the vicinity of the loadout are the Sunnyside Mine (inactive), Horse Canyon Mine (inactive), the Centennial Mines and Soldier Canyon Mine.

No major fault systems are evident in the vicinity of the loadout.

B. Topography and Precipitation

The area surrounding the Banning Loadout is arid. Principal uses are range land and wildlife habitat. Topography over the site is relatively flat with small rolling hills.

Average annual precipitation is between six and eight inches. The mean annual air temperature is 9° to 10° C. Annual snowfall contributes to this value with the area generally snow-covered from early

November to mid-April.

The facility is located within a Greasewood-Shadscale desert shrub association of the Upper Sonoran (cold desert) life zone. Common vegetation species include; Shadscale, Broom snakeweed, Greasewood, Fringed sage, Blue grama, Indian ricegrass, Bottlebrush squirreltail, Sand dropseed, Prickly pear cactus and several perennial and annual weeds.

The soil at the Banning Loadout facility is primarily alluvium, derived from sandstone and shale. A torric moisture with a mesic temperature regime prevail. The average annual soil temperature higher than 8° C but less than 15° C.

Under native vegetation the erosion associated with the soil is moderate. The hazard of soil wind erosion is moderate. This soil is generally well drained and ranges in texture from a loam to silt loam. Permeability is moderate. The available water capacity ranges from 7.5 to 10.5 inches. The soil is strongly alkaline and is in the Alkali Flat range site.

The only soil identified in the Banning Loadout area is the Ravola series. The Ravola series is taxonomically classified as a fine-silty, mesic Typic Torrifuvent. Topsoil pH ranges from 8.3 to 9.1 while the substratum pH ranges from 8.4 to 9.7. Carbonate equivalent is 5 to 25 percent. Electrical conductivity ranges from 0.9 to 25 mmhos/cm, with the mean topsoil electrical conductivity of 5.06 mmho/cm and subsoil mean electrical conductivity of 10.76 mmho/cm. Of the three soil sample sites, one location had a low sodium adsorption ratio (SAR) of 1.4 to 3.7, while other sample sites are strongly alkaline with the SAR ranging from 37 to 54, median of 51.3. See Table 6.2-1, page 6-6 for further details.

Physical deterioration of the soil structure caused by high amounts of sodium should be negated by high salts in the soil medium. Percent clay levels range from 18 to 27 percent. No slickspots (sodium dispersed soils) were evident in the Banning Loadout Facility area.

The native soil has a moderate coarse subangular blocky structure down to 23 inches of the profile. Soil structure is massive from 23 to 60 inches. The disturbed soil is contiguous with the undisturbed Ravola series.

V. Hydrologic Resources

A. Ground Water

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

The Banning Loadout is constructed on the eroded surface of the Mancos Shale. The shaley units of the Mancos Shale have a very low permeability and serve as confining beds for the underlying formations rather than aquifers. Drillhole data from petroleum exploration in the region suggest that the Mancos Shale, where saturated, contains water that is moderately to very saline (Waddell, et al., 1981). Development of the uppermost saturated zone beneath the site has not occurred. This will further limit

impacts to the ground water.

Complete information regarding regional and local ground water gradients and flow is incomplete. Information garnered from observation within and near the mine suggests ground water exists to some extent in the relatively low permeable Mancos shale. Although the application does not present site specific data for the area, research by Waddell (1981) and Hood and Patterson (1984) is cited in the Mining and Reclamation Plan (MRP). Transmissivities in the Mancos shale tend to be very low and water quality is considered to be poor (section 5.1.2 of the MRP).

Springs do not occur within the CIA. One ground water source has been developed by the operator. A sump about 16 feet deep was excavated to pick up moisture from the vados zone and water from the coal. The sump is located in the lower part of the basin and is sealed with cement at the bottom. Recharge to the sump varies, but averages about 1000 gallons per day. The water is mostly pumped for dust suppression at the site. Recently, the water has been discharged under a National Pollutant Elimination Discharge System (NPDES) permit (UT-0023817).

B. Surface Water

The Banning Loadout permit area is located in the Grassy Trail Creek watershed in an unnamed tributary drainage basin. Grassy Trail Creek is classified as an intermittent stream with most of the annual flow occurring during the spring runoff. There are no perennial streams in the vicinity of the loadout and the annual water yield of the area is very low, therefore the operation will have little effect on the existing surface water regime. Water quality of surface and ground water in the permit area is poor with high concentrations of dissolved solids.

The operation is located in an ephemeral drainage basin within the Grassy Trail Creek watershed. The site is developed on the relatively flat alluvium underlain by the Mancos shale. The slope of the site and surrounding permit area is approximately 1 - 4 percent. A small ephemeral tributary to Grassy Trail Creek is located adjacent to the northwest corner of the permit area (reference U.S.G.S. Sunnyside Junction, Utah Quadrangle and Figure 2).

The surface waters flow only during spring snowmelt and during thunderstorms later in the summer. There are no continuous discharge records for this drainage because of the characteristic low flows. Research has shown the water quality of Grassy Trail Creek to be poor with high concentrations of dissolved solids.

The applicant proposes to divert disturbed area runoff to the sedimentation pond by the using berms and diversion ditches.

The applicant has applied for an NPDES permit and commits to monitor all discharges from the pond. The applicant proposes to monitor discharges occurring through the straw bales and silt fences along the haulage road as occurrence of runoff allows (section 5.3.1, MRP).

There is no riparian habitat associated with the permit area or other critical valued wildlife habitat.

VI. Potential Hydrologic Impacts

A. Ground Water

The only identifiable ground water resource within the CIA is highly saline. Due to the very low transmissivities of the shale and high concentrations of salts in the Mancos Shale, it is concluded that there will be no adverse effects to ground water or adjacent surface waters.

B. Surface Water

The primary potential for acid- or toxic- forming materials (ATFM) would be generated from the coal. A sampling and testing program for coal stored at the site is proposed by the operators.

The existing water resources in the vicinity of the site are considered to be of marginal importance due to existing low water quality. Waters in the area are heavily influenced by the Mancos shale formation which dominates the entire region. Water quality in the region tends to be characterized by high concentrations of total dissolved solids. Samples from Grassy Trail Creek upstream from U.S. Highway 6 had total dissolved solids concentrations ranging from 872 to 2510 milligrams per liter (section 5.1.1, MRP) Natural surface drainage channels in the permit area do not exist.

The area influenced by surface disturbance is of limited areal extent. Surface sediment controls currently are in place and will continue to be in place during reclamation. A sediment pond will treat drainage from the majority of the area. The pond is conservatively designed as it will sufficiently contain the 100 yr - 24 hr precipitation event.

The water quality impacts associated with reclamation will be minimal or nonexistent due to the fact that all drainage from the disturbed area will be routed through these sediment controls and treated prior to any discharge. Site-specific erosion control practices, such as riprap, silt fences, surface pitting, and energy dissipators will be used to control erosion of small areas within the disturbed area.

The operational design proposed for reclamation of the Banning Loadout is herein determined to be consistent with preventing damage to the hydrologic balance outside the mine plan area.

C. Conclusion

In conducting operations as prescribed to in their Mining and Reclamation Plan, there are no foreseen impacts to the hydrologic regime for the Banning Loadout. Abnormal deterioration of ground and surface waters due to the storage and handling of coal should not occur off the permit area.

References Cited

Doelling, H.H., 1972, Central Utah Coal Fields, Utah Geological and Mineralogical Survey Monograph Series No. 3.

Soldier Creek Coal Company, Banning Siding Loadout Mining and Reclamation Plan, Submitted January 4, 1988, revised August 5, 1988.

Stokes, William Lee, 1986, Geology of Utah, Utah Geological and Mineral Survey Publication.

August 28, 1988

TO: File

FROM: David W. Darby, Geologist

RE: Technical Deficiencies Review-South Fork Canyon Breakout, Skyline Mine, ACT/007/005-88-B, Utah Fuel Company, Folder #2, Carbon County, Utah

Synopsis

A technical review of Utah Fuel Company's South Fork amendment has been conducted for ground water and subsidence issues. The South Fork Breakout proposed for ventilation purposes was originally submitted on April 27, 1988. As with their most recent proposal of July 18, 1988, Utah Fuel Company has failed to address locations and discharge volume of springs in the area.

The amount of subsidence that will occur in the vicinity of the Breakout is a concern because of the low overburden in the area. Utah Fuel Company has presented plans to conduct subsidence surveys using the photogrametric method.

There is good potential that multiple seam and maximum extraction mining can cause caving fractures adjacent to the breakout area which may intercept ground water storage in perched aquifers of the Blackhawk Formation and interrupt baseflow to springs. Baseline information for springs and subsidence is important in determining the hydrologic effects in the vicinity of South Fork Canyon, also for gaining an insite of the effects mining will have on areas similar in design in adjacent areas of the permit.

Summary of Permit Review

The Division was not able to conduct an evaluation of the potential mining effects to ground water for the South Fork Breakout with the submission of new information detailing the proposed mining sequence. Findings show that subsidence effects for this time period will not result in transbasin diversion of ground water.

Subsidence effects will be minimized for next 5-year mine permit term except where mining is planned under the South Fork of Eccles Canyon during 1990 to 1992.

Full extraction mining (mining height of ten to thirteen feet from longwall mining) will take place where overburden ranges from 200 feet at the coal outcrop barrier to 800 feet at the watershed divide. Mining in this area is expected to subside the land surface and intercept ground water supply to springs.

A report from Randy Harden, DOGM, who visited the site indicated that springs exist on the road where Utah Fuel Company plans to place the topsoil stockpile.

Total effects to the springs have not be summarized at this time. Plate 5 shows nine springs in the vicinity of the South Fork of Eccles Creek that were monitored during the fall of 1978. For the most part the discharges from these springs appear small, however, current data should be submitted to verify a total discharge volume.

Conclusion

To ensure minimal impacts for the next 5-year permit and life of mine the operator will be required to provide the following information.

UMC 817.41 and UMC 817.52

The operator will be required to conduct a complete inventory of springs in the South Fork of Eccles Canyon where mining will take place and establish the flow (at least one year) of the tributary fed by the springs prior to conducting mining operations.

UMC 817.121 and UMC 817.124

The operator will be required to establish baseline subsidence information for the South Fork Area prior to conducting underground mining operations. This information will essentially consist of premining surface elevations obtained by either aerial photographs or transit surveys.

dwd

cc.

S. Linner
R. Harden

1299R-44

September 12, 1988

TO: File

FROM: David W. Darby, Geologist

RE: Compliance to Stipulation UMC 817.121-.126-DD, Summit Coal Company, Inc., Boyer Mine, CEP/043/002, Summit County, Utah, Folder #2

Synopsis

Page 5 of the Technical Review Document of May 15, 1988 (State Permit and Decision Document) outlines subsidence control deficiencies in Summit Coal Company' Mine Permit Application.

On June 15, 1987 Summit Coal Company (SCC) submitted the required information to address and comply with the conditions outlined in Stipulation UMC 817.121-.126-DD (See Letter to Mr. Richard Blonquist from Dianne Nielson May 15, 1987) for subsidence monitoring and ground control.

Recommendations

Summit Coal Company has met the requirements of Regulations UMC 817.121-.126. These stipulations have been fully addressed and the information can be incorporated in the Mining and Reclamation Plan.

dwd

cc: R. Harden
S. Linner
R. Summers

1565R-15

September 16, 1988

TO: FILE

FROM: David Darby, Geologist

RE: Amendment to Ground and Surface Water Monitoring Plan, Hiawatha Mine Complex, U. S. Fuel Company, ACT/007/011-88D, Carbon County, Utah, Folder 2.

Synopsis

United States Fuel Company (U.S. Fuel Co.) proposed a modification of their surface and ground water monitoring program based on the transfer and sales of coal rights previously held by the company for mining.

In December 1985 U.S. Fuel Co. leased the northern portion of section 18 of T 15 S., R 8 E. to Plateau Mining Company. This area is located in Exhibit VII-1C (map) in the mine plan. This area encompasses the upper reaches of the north fork of the Right Fork of Miller Creek. Three springs discharge from within or above this area, (D-15-7)12dba, SP-14 and SP-1.

In March of 1986 U.S. Fuel Co. sold a large block of coal rights that encompass their holdings below the Left Fork of Cedar Creek. This area is also shown of Exhibit VII-1C. Stations that are currently being monitored are ST-7, SP-6 and SP-8.

U.S. Fuel Co. requested to delete monitoring stations SP-6, SP-8, SP-9 and St-7 from their monitoring program, since they do not plan to mine in the vicinity of these sites or intercept flow which supplies these sites.

Analysis

A review was conducted to evaluate the necessity of these monitoring sites to the proposed mining area. It is determined that these monitoring sites are not necessary and will not reflect the hydrologic regime of the new mining area as proposed.

Recommendations

U.S. Fuel Company can delete monitoring sites SP-6, SP-8, SP-9 and St-7 from their water monitoring program.

For the remainder of the water monitoring sites, U.S. Fuel Company should implement the water monitoring changes established by Thomas Munson and myself as outlined in the Amendment Deficiency letter submitted to U.S Fuel Company on August 18, 1988.

dwd

cc: S. Linner

R. Summers

1565R

Geologist
Classification Specifications
Coal Regulatory Program

Grade 21

Graduate from an accredited 4 year program in geology or earth science.

Knowledge of geohydrology and engineering geology.

Ability to conduct geologic reviews of coal mining operations consistent with governing regulations

Must have technical writing skills

Ability to communicate with coal mining operators

Grade 24

Graduate from an accredited 4 year program in geology or earth science.

Knowledge of Utah Geology

Knowledge of Utahs Coal Mines

Knowledge of Regulations governing coal mining

Knowledge of geohydrology and engineering geology

Ability to conduct technical reviews of coal mining operations, prepare reports, tables, maps and charts

Ability to communicate with coal mining operators

Castle Gate Coal Company
ACT/007/004
Permitting Action

Action 87-A

Action Descript. Quarterly Sed Pond Inspection

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| Rec'd 1/7/87 | Review Comp. | Cond. Appr. 3/5/87 |
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Final Approval 7/30/87

Action 87-B

Action Descript. IBC--Stoker Coal Loudout

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| Rec'd 1/12/87 | Review Comp. | Cond. Appr. |
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Final Approval 5/19/87

Action 87-C

Action Descript. 2nd IBC--Unit Train Loadout

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| Rec'd 1/30/87 | Review Comp. | Cond. Appr. |
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| Resub. Date 4/6/87 | Review Comp. 4/14/87 | Cond. Appr. 4/7/87 |
| Stip | Stip due 4/30/87 | Stip Addr. defic. |

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| Resub. Date 5/1/87 | Review Comp. 5/6/87 | Cond. Appr. |
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Stip Stip due 5/30/87 Stip Addr.
Change to amendment - Bridge proposed instead of culverts.

5/22/87 Received request to delay as-builts until mid-term.

Resub. Date 2/1/88 Review Comp. 4/4/88 Cond. Appr.
Stip Stip due Stip Addr. defic.

Resub. Date 3/17/88 Review Comp. 3/28/88 Cond. Appr.
Stip Stip due 5/10/88 Stip Addr.

Final Approval

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Final Approval

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Final Approval

June 19,1988

TO: File

FROM: David Darby, Geologist

RE: Technical Analysis (TA), Banning Siding, Soldier Creek Coal Company, ACT/007/043, Folder No. 2, Carbon County, Utah

Summary

Soldier Creek Coal Company's (SCCC) submitted information in their Mining and Reclamation Plan (MRP) on July 13, 1988 pertaining to the geology, ground water hydrology and subsidence for the Banning Siding loadout. This information has been reviewed for technical adequacy.

The following comments indicate the status of completeness for each of the following regulations.

UMC 817.52 Hydrologic Balance

GROUND WATER

The geologic characteristics in the vicinity of the mine area are described in Chapter 5, sections 5.1.2 and 5.4.2.

Ground water monitoring is discussed in Chapter 5, section 5.3.2.

Applicants Proposal

The Banning Siding loadout is located on the eroded surface of the Mancos Shale. The shaley units of the Mancos Shale have a very low permeability and serve as confining beds for the underlying formations rather than aquifers. Drillhole data from petroleum exploration in the region suggest that the Mancos Shale, where saturated, contains water that is moderately to very saline (Waddell, et al., 1981). Development of the uppermost saturated zone beneath the site has not occurred. This will further limit impacts to the ground water.

The primary potential for effecting ground water will come from leaching of constituents from the coal. To determin the potential of this happening, the applicant will collect a coal sample from the mine on an annual basis and have it analysed to determin if acid or toxic material will be generated.

If test results indicate that coal stored on site is contaminated, the applicant will install two monitoring wells and monitor them as outlined on page 5-15, Volume 1 of the Mining and Reclamation Plan.

Technical Analysis
ACT/007/019
May 29, 1988

Compliance

The information presented in the Mining and Reclamation Plan by Soldier Creek Coal Co. concludes the potential negative impacts this loadout will have on the ground water system. The Regulatory Authority concurs that transmissivities within the shale members are very low. The permeability of the shales should retard vertical flow from overland flow and leachates from reaching any saturated zones. The proposed monitoring plan is acceptable to the Regulatory Authority.

Stipulation-UMC 817.52-DD

None

UMC 817.121-126 Subsidence Control Plan

Applicant's Proposal

Since this operation is a loadout, there will be no underground disturbance at the site.

Compliance

This section is not applicable.

Stipulations

None.

cc: S. Linner
R. Summers
1565R