HIDDEN VALLEY CHIA

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT
CALMAT
HIDDEN VALLEY MINE
INA/015/007
EMERY COUNTY, UTAH

December 8, 1986

I. INTRODUCTION

The purpose of this report is to provide a Cumulative Hydrologic Impact Assessment (CHIA) for Calmat's Hidden Valley Mine located in Emery County, Utah (Figure 1). The assessment encompasses the probable cumulative impacts of all anticipated coal mining in the general area on the hydrologic balance and whether the operations proposed under the application have been designed to prevent damage to the hydrologic balance outside the proposed mine plan 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), respectively.

Calmat's Hidden Valley Mine is located approximately seven miles southwest of Emery, Utah in Section 17 and 18, Township 23 South, Range 6 East (Figure 1). The mine is located in the Emery Coal Field 35 miles east of Salina, 70 miles south of Price in Sevier and Emery counties. The effective width of the Emery Coal Field is from 4-8 miles and a length of about 35 miles (Doelling, 1972). Elevations in the Emery Coal field vary from 6,000 feet to over 8,000 feet.

Outcropping rocks of the Emery Coal Field range in age from Lower Cretaceous to Quaternary in age. The rock record reflects oscillating transgressive and regressive sequences that include, in ascending order, fluvial through littoral (Dakota Sandstone), marine (Tununk Shale), fluvial and lagoonal (Ferron Sandstone) and marine (Blue Gate Shale, Emery Sandstone, Masuk Shale) depositional environments. Uncomformably overlying Cretaceous sedimentary rocks are Tertiary volcanics and Quaternary deposits. The major coal-bearing unit in the Emery Coal Field is the Ferron Sandstone.

Annual precipitation varies from 30 inches in the Upper Ivie Creek drainage to slightly more than 7 inches per year at the minesite. The area around the minesite could be considered a semi-arid to arid climate regime.

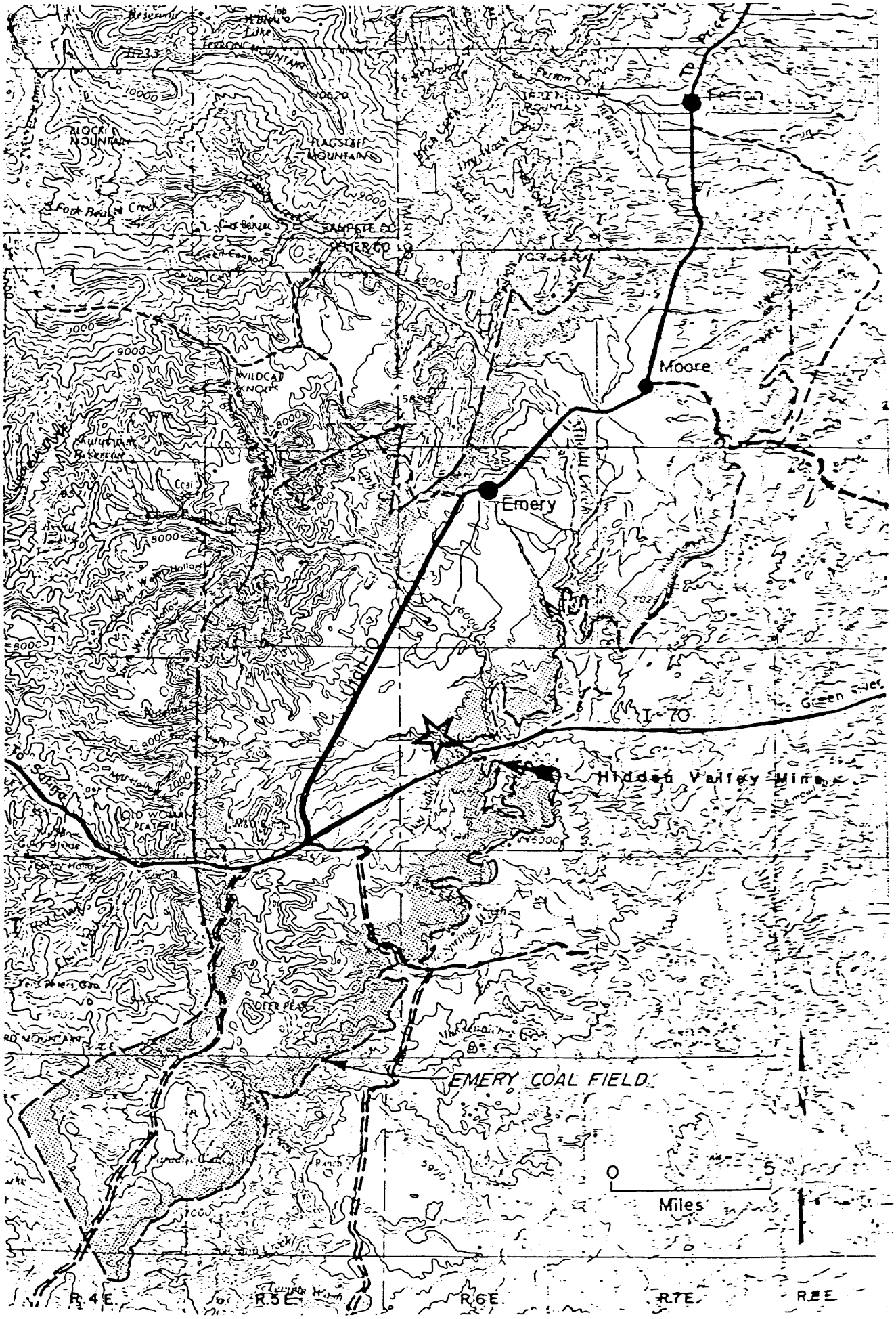

Figure 1. Emery Coal Field

Vegetative types found within the vicinity of the Emery Coal Field area are part of the Desert Shrub and Pinyon-Juniper plant associations. The desert shrub association occurs on the lower benches and valley bottoms. The Pinyon-Juniper plant association occurs on the higher benches and upper slopes where the soils are more sandy and better drained.

The Emery Deep Mine and proposed Emery Surface Mine are located along Quitchapah Creek approximately 2.5 miles north of the Hidden Valley Mine. The J. B. King Mine located approximately 2.5 miles south of the Hidden Valley Mine has been reclaimed. The active, proposed and reclaimed mines are all sited within the Emery Coal Field. Permitting actions have derived Cumulative Hydrologic Impact Assessments (CHIAs) for the Emery Deep Mine and the J. B. King Mine. CHIA findings for the J. B. King Mine indicate minimal mining-induced impacts to surface and ground-water resources (J.B.. King Mine CHIA), whereas those for the Emery Deep Mine suggest increased salt loading to Quitchapah Creek and decreased ground- water levels in the Ferron Sandstone aquifer (Emery Deep Mine CHIA).

II. CUMULATIVE IMPACT AREA (CIA)

Figure 2 delineates the CIA for the Hidden Valley Mine. The CIA includes the SE 1/4 of Section 12, E 1/2 of Section 13, and NW 1/4 of Section 24, Township 23 South, Range 5 East and the S 1/2 of Section 7, S 1/2 of Section 8, N 1/2 of Section 19, N 1/2 of Section 20, Section 18 and Section 17, Township 23 South, Range 6E. The CIA encompasses 3,200 acres.

III. SCOPE OF MINING

Development mining within the study area began on April 17, 1980 following approval under the Interim Program Regulations.

The permit area encompasses 910 acres. Development mining occurred in the A and C/D seams of the Ferron Sandstone and consisted of two exploratory adits driven total lengths of approximately 240 feet (C/D seam) and 260 feet (A seam). Total underground development was less than 1/4 acre.

Surface disturbance encompassed approximately 7.0 acres and consisted of constructing and installing a road, pads and drainage control structures.

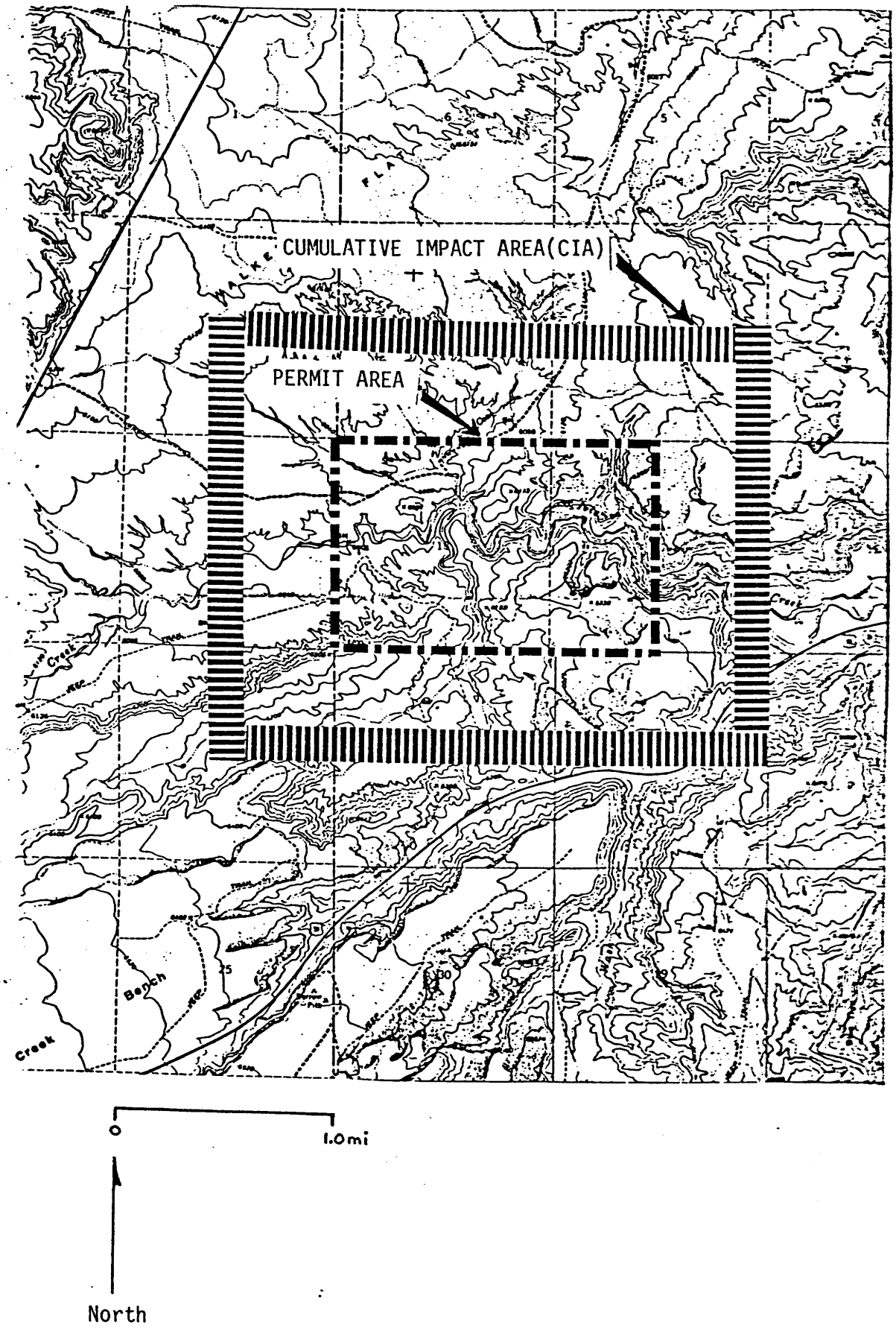

Figure 2. Cumulative Impact Area (CIA).

IV. STUDY AREA

A. Geology

Stratigraphic units outcropping within the study area include, from oldest to youngest, the Tununk Shale, Ferron Sandstone, Blue Gate Shale and Quaternary deposits. Lithologic descriptions and unit thicknesses are given in Figure 3.

System	Series	Stratigraphic Unit	Thickness (feet)	Description
Quaternary	Holocene Pleistocene	Quaternary Deposits	Variable	Surficial stream terrace and alluvial fan deposits.
Upper Cretaceous	Coniacian	Blue Gate Shale Member	1,600	Pale blue-gray, nodular and irregularly bedded marine mudstone and silt-stone.
	Turonian	Ferron Sandstone Member (major coal seams)	400-500	Alternating yellow-gray sandstone, sandy shale and gray shale with important coal beds of Emery Coal Field.
	Cenomanian	Tununk Shale Member	600-700	Blue-gray to black sandy marine mudstone.

Figure 3. Stratigraphy of the Hidden Valley Mine Area (modified from Doelling 1972).

Rocks in the study area strike generally north and dip one to two degrees to the west. Principal coal accumulations occur within the Ferron Sandstone Member of the Mancos Shale. Two coal seams with economic potential have been identified and are termed, in ascending order, the Ferron "A" and "C/D" seams.

B. Topography and Precipitation

Topography ranges from less than 5800 feet to over 6400 feet in the CIA.

The study area is characterized by an easterly system of small exphemeral drainages.

Average annual precipitation is approximately 7 inches. The CIA may be classified as semi-arid.

C. Vegetation

The majority of vegetation of the CIA can be classified within Desert Shrub and Pinyon-Juniper Vegetation Associations. Desert Shrub types occupying lower benches, valley bottoms and rocky cliffs include Shadscale - Galleta grass, Shadscale - Indian ricegrass - Drop seed, Mat saltbush - Indian ricegrass, and Greasewood - Saltgrass. Pinyon and Juniper woodlands occupy higher benches and upper slopes. Understory vegetation of the woodlands include either Sagebrush species and Galleta grass or Mixed Mountain Shrub species.

Riparian vegetation is limited to narrow ribbons of dense vegetation along both perennial and intermittent creeks. Common plants include Greasewood, Reed canary grass, Saltgrass, Rabbitbrush and Tamarisk.

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.

Springs do not occur within and adjacent to the CIA. Exploration drilling (4 boreholes) within the permit area encountered subsurface water in the Ferron Sandstone. Three of the boreholes, located in the western portion of the permit area, encountered artesian conditions. Wells drilled to similar depths in the eastern portion of the permit area were dry. All boreholes were plugged and abandoned in compliance with Chapter I of the Coal Mining and Reclamation Permanent Program.

Morrissey, Lines and Bartholoma (1980) identified the Ferron Sandstone aquifer as a regional ground-water resource of the Emery Coal Field and concluded that recharge to the Ferron Sandstone aquifer occurs mainly as subsurface inflow from the Wasatch Plateau. Moreover, natural discharge occurs to alluvium along streams, leakage to the

underlying Tununk Shale, upward leakage to the Blue Gate Shale and negligible discharge by seeps and springs (Morrissey, Lines and Bartholoma, 1980).

Data derived by the operator indicate water quality of the Ferron Sandstone aquifer is characterized by elevated sulfate, bicarbonate and sodium values.

B. Surface Water

The Hidden Valley Mine site is located within a 1590 square mile area which forms the Muddy Creek drainage basin. The largest stream in the area is Muddy Creek, with Quitchupah and Ivie Creek being the only other streams of significant size. Muddy Creek flows southwest and converges with the Fremont River which then forms the Dirty Devil River. The Dirty Devil River converges with the Colorado River in southeastern Utah. The total drainage area for Ivie Creek is about 131 square miles, or 8.2 percent of the Muddy Creek Drainage Area. The average land slope is 21 percent.

VI. POTENTIAL HYDROLOGIC IMPACTS

A. Ground Water

The only recognizable ground-water resource within the CIA is the Ferron Sandstone aquifer. Development mining, of less than 1/4 acre, did not intercept the ground-water resource. Accordingly, a mining or reclamation induced dewatering impact is determined to have a low probability.

Mining development consisted of two exploratory adits approximately 20 feet wide and 250 feet long. Potential subsidence encompasses less than 1/4 acre at the surface and will not occur within the aquifer recharge area. Accordingly, ground-water impacts related to mining-induced subsidence are determined to be negligible.

B. Surface Water

No material damage to surface water has occurred because of the limited development at the Hidden Valley Mine. Sediment control is currently in place and will remain in place until the reclamation bond is released. Any sediment loading associated with reclamation of minor ephemeral channels will be minimal or non-existent due to the use of alternative sediment controls and riprap protection in the channels.

No material damage is expected to occur during reclamation due to the operator's use of silt fences to trap and treat any runoff waters from disturbed areas adjacent to reclaimed channels. Other water

quality parameters have not been considered due to the nature of the disturbance and its anticipated impact. Accordingly, the surface water impacts associated with reclamation are determined to be negligible.

CONCLUSIONS

Mining in the Wasatch Plateau Coal Field is considered sufficiently removed hydrologically that it will not adversely impact water resources in the Emery Coal Field area. Hydrologic impacts associated with J. B. King Mine have been determined to be minimal. An assessment of hydrologic impacts related to the Emery Deep Mine and proposed Emery Surface Mine indicates an increase in salt loading and decrease in ground-water levels.

Hydrologic impacts associated with the Hidden Valley Mine will contribute negligibly to the impacts identified for the Emery Deep Mine and proposed Emery Surface Mine. Accordingly, it is herein determined that the reclamation plan for the Hidden Valley Mine is consistent with preventing damage to the hydrologic balance outside the permit area.

REFERENCES

Utah Division of Oil, Gas and Mining, 1985, J. B. King Mine: Cumulative Hydrologic Impact Assessment, Final Technical Analysis, 10p.

Doelling, H. H., 1972. Central Utah coal fields: Sevier-Sanpete, Wasatch, Plateau, Book Cliffs and Emery: Utah Geological and Mineral Survey, Monograph Ser. No. 3.

Morrissey, D. J., Lines, G. C., and Bartholoma, S. D., 1980, Three-dimensional digital-computer model of the Ferron Sandstone aquifer near Emery, Utah: U. S. Geological Survey, Water Resources Invest. 80-62, 101p.

Office of Surface Mining, 1985, Emery Deep Mine: Cumulative Hydrologic Impact Assessment, Final Technical Analysis, 11p.