

CHAPTER XII
Geotechnical

PART 12.3 Underground Mine Design

12.3.1 Geotechnical Tests and Analysis

Based on data supplied by various mining firms operating in same seam of coal under similar conditions and upon "Roof Control Plan" criteria published by the U. S. Department of Labor, M.S.H.A..

12.3.2 Coal Pillar Design

Applicant determines that coal pillar sizing to be 50' x 100' as submitted for approval by M.S.H.A. under current federal regulations.

12.3.3 Roof Span Design

Applicant determines that roof span design will be maximum of 20 feet unsupported for any purpose as submitted for approval by M.S.H.A. under current federal regulations, 43 CFR 75.200 related to roof control plan criteria and minimum requirements.

PART 12.4 Surface Subsidence Effects of Mining

Survey indicates subsidence effects will be negligible. No instigation or monitoring proposed by applicant. Copy of survey included with this Chapter as Item XII-1.

12.4.1 Subsidence Mechanisms

Not applicable

12.4.2 Projected Subsidence Effects

Not applicable

12.4.3 Subsidence Control and Mitigation Methods

Not applicable

12.4.4 Subsidence Monitoring Plan

Not applicable

Chapter XIII Continued-

PART 12.5 Stability Analysis of Earthen Structures

- 12.5.1 Type of Structure
Only proposed earthen structure will be a sedimentation pond. Final design of this structure will be submitted at a later date, as allowed by the Division and as stated elsewhere in this application. The final design will contain complete geotechnical analysis information, hydrologic characteristics with complete design and construction plans.
- 12.5.1.1 Hazard Considerations
Not applicable
- 12.5.2 Construction Material Characteristics
Not applicable
- 12.5.3 Foundation Material Characteristics
Not applicable
- 12.5.4 Hydrologic Characteristics
Not applicable
- 12.5.5 Design and Construction Plans
Not applicable
- 12.5.6 Stability Analysis
Not applicable

PART 12.6 Bibliography

NONE



December 2, 1980

Charles Hanna
 Boyle Engineering Corp.
 268 West 400 South, Suite 301
 Salt Lake City, UT 84101

Dear Charles,

The intent of this letter is to formalize our discussion of November 26, 1980 regarding geotechnical work for the Crandall Canyon Gen Wal Coal Project. Areas of discussion were mine subsidence, slope stability, and foundation investigation for the bridge across Huntington Creek.

MINE SUBSIDENCE

OSM requirements related to mine subsidence are attached. In reviewing these articles we do not see any area of the regulations where problems should be expected. Further, no work should be done at this time unless regulating authorities insist. No surface structures exist above the portal at present, and the size of the proposed coal mine will not significantly affect surface drainage features if subsidence does occur.

Monitoring of subsidence can be done with bench marks and conventional survey methods; however, in rugged terrain pot holing and localized subsidence may be overlooked. Periodic aerial photos examined by an aerial photo specialist would reduce this possibility.

Detailed subsidence studies, if undertaken, would necessarily include correlating mining technique, i.e. room and pillar, with overburden strata and overburden pressures. Mining plans would be required and rock coring and strength testing would be necessary. Structural calculations could then be performed and a report prepared upon request.

SLOPE STABILITY - ROAD

OSM design criteria for Class I roads are attached. Since many cut and fill sections are very steep, slope stability calculations will be required to satisfy the minimum factor of safety against sliding of 1.5 or 1.25. (Although Forest Service criteria may be slightly different it is probable they would accept a design in conformance with OSM requirements.)

Charles Hanna
December 2, 1980

Page Two

In order to check slope stability on the proposed road we would need to pursue the following:

1. Boyle Engineering; prepare profile and cross section of proposed road with native slope identified. (Include alternate plan on south side of stream.)
2. R&M; identify potential hazardous zones and field investigate native materials and bedrock configurations with an experienced Engineering Geologist. In most instances, bedrock depth and position would be cross-sectioned in the field.
3. R&M; determine soil engineering parameters for use in slope stability calculations with soil tests from field samples, i.e. classifications, cohesion, angle of internal friction, etc. Samples will be taken where possible utilizing backhoe test pits. Although not desired, an occasional boring may be required in an extremely critical area. This, of course would require prior authorization by Boyle Engineering.
4. R&M; perform stability calculations and prepare a final report on identified critical sections. Geologic hazards will also be reviewed at this time including seismic activity, rock fall, etc.

Costs for the above items will be dependent on the number of slopes requiring checking, computer costs, lab tests, backhoe costs, etc., however a not to exceed value of around \$4,600.00 would be reasonable. A recent study on slope stability for Boyle Engineering was accomplished for approximately \$1,800.00, however only one slope was reviewed and no construction equipment was required. Bedrock implications dictate further and more detailed study for this project.

BRIDGE FOUNDATION INVESTIGATION

One boring at each foundation is recommended for the proposed bridge. These borings and subsequent lab tests on samples taken would provide the basis for recommendations concerning scour depth, foundation type, settlement predictions, and construction methods. The following costs may be anticipated:

Drilling - 24 hrs @\$65/hr	\$1,560.00
Drilling Mobilization	500.00
Testing - Cost + 15%	400.00 (approx.)
R&M Geologist - 24 hrs @\$35/hr	840.00
R&M Field, Analysis, Drafting & Typing	2,720.00
Reproduction	50.00
Per Diem - 3 men, 2 days @\$40/day	240.00
Automobile - 3 days @0.30 per mi + \$30 per day	240.00
Other (See Attached Schedule)	
Estimated Total	\$5,710.00

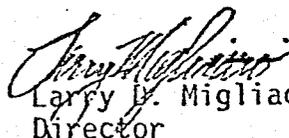
Charles Hanna
December 2, 1980

Page Three

We recommend authorization to proceed on a time and materials basis for an amount not to exceed \$10,310.00 for all slope stability and bridge foundation studies. Every effort will be made to reduce the above estimated cost. Upon finding favorable field conditions, there is a good chance this cost can be reduced considerably with reduced drilling, etc.

Please call if you wish to discuss any of the above information in more detail. In the event you wish to proceed we would appreciate as much notice as possible.

Sincerely,


Larry D. Migliaccio, P.E.
Director

CW

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