



United States Department of the Interior
OFFICE OF SURFACE MINING
Reclamation and Enforcement
BROOKS TOWERS
1020 15TH STREET
DENVER, COLORADO 80202

RECEIVED

JUL 10 1985

JUL 12 1985

Dr. Dianne Nielson, Director
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

Dianne
Dear Dr. Nielson:

In a letter dated June 11, 1975, your office requested detailed bonding information for the Belina Complex, Soldier Canyon and Price River Complex mines. Enclosed is all available supportive information for the Soldier Canyon mine bond. All supportive bonding information for the other two mines is included in the technical analyses for these mines and was forwarded to your office. No other information related to bonding calculations for these two mines is available.

If there are any questions, please contact Richard Holbrook at (303) 844-3806.

Sincerely,
Richard E. Dawes
for Allen D. Klein
Administrator
Western Technical Center

*ACT/007/001 } #5
ACT/007/018 }
ACT/007/004 }*

Enclosure

OSM-WTC

1985 JUN 17 AM 8:48

WESTERN REGIONAL CENTER

BOND ESTIMATE FOR THE SOLDIER CANYON MINE

Prepared for:

Engineering Sciences
10 Lakeside Lane
Denver, Colorado

Prepared by:

Richardson Associates
P.O. Box 5111
Denver, Colorado 80217

September 6, 1984

SUMMARY OF THE BOND ESTIMATE FOR THE SOLDIER CANYON MINE

| | |
|-------------------------|----------|
| Mine Area | \$292000 |
| Sewage Lagoon *1 | 4620 |
| New Ventilation Site *2 | 12960 |
| Rock Disposal Site | 401000 |
| Maintenance | 7140 |

TOTAL \$718000 → 717720

Additional costs:

Supervision:

Costs for supervision were included in the bond estimate for all categories except structure removal which was recalculated by the regulatory authority. It is assumed here that for that phase of the operation, a field engineer will be required for 2 months.

Cost = \$31.33/hr x 3 mon. x 20 days/mon. x 8 hr/mon. = \$15000 15038.40

Mobilization and Demobilization:

This cost was included by the applicant = \$12000

Contingency:

10% of the above total = ~~\$71800~~ 71772

Escalation:

6.67% compounded annually for five year permit term (rate currently used by DOGM) = \$274,000

GRAND TOTAL = \$1,090,800

*1 \$4574.00 (1983) x escalation 1983 - 1984 of 1.04% = \$4620

*2 \$11,723.76 (1982) x escalation 1982 - 1983 of 9.4% and from 1983 - 1984 of 1.04% = \$12960

BOND ESTIMATE FOR THE SOLDIER CANYON MINE

SOLDIER CANYON MINE AREA

This bond estimate is based in part on bond estimates submitted by the applicant and on estimates developed by the OSM. The applicant's estimates have been reviewed in detail, and where necessary updated or corrected to reflect current bonding approaches. Where an estimate by the applicant was used, this document only sites the estimate in the PAP, any changes that were made, and the final amount. Additions made by the regulatory authority are included in total in this document.

The primary changes dealt with the unit costs used by the applicant. All unit costs were revised to reflect the following unit costs from the 1984 Rental Rate Blue Book. These costs are all monthly costs reduced to hourly costs with the hourly operating rate added on. An operator has been added to the equipment costs at a rate of \$28.45/hour (from the Means Cost Reference Guide). These changes have in some instances raised the unit costs proposed by the applicant and in others decreased it.

| | |
|--|------------|
| Grove Model 68 Crane | \$73.20/hr |
| Cat D-8 Dozer | \$60.62/hr |
| Cat 950 Loader | \$80.14/hr |
| 10 Cubic Yard Rear Dump Truck | \$59.72/hr |
| 953 Crawler Loader | \$67.39/hr |
| 1 CY Linkbelt Crawler Mounted Backhoe | \$96.73/hr |

Labor rates have been increase to \$21.95/hr and the cost for the foreman has been increased to \$31.33/hr (from the Means Cost Reference Guide).

Other unit costs which were added to the bond are itemized in Attachment 1.

STRUCTURES REMOVAL

The estimate prepared by the applicant for this catagory did not have any back-up calculations showing how the equipment requirements were determined. Therefore, an alternative approach has been taken by the reviewer to check the proposed amount. This approach was to catalog all of the structures at the site based upon maps in the PAP. The area of the structures was taken from the maps. The height of the structures was estimated to obtain their volume along with the material that the structure was made of. The Means 1984 Building Construction Cost Data was then used to estimate demolition (see Attachment 1 for the unit costs used in this analysis).

| STRUCTURE | VOLUME *1 (CY) | AREA OF FOUNDATION (SF) *2 | OTHER |
|--|-------------------|-------------------------------|--------------|
| Original substation | 178 | 480 | |
| Belt structure | 1312 | 794 | |
| Original fan | 648 | 1750 | |
| Water tank | 454 | 491 | |
| Coal loadout bin | 690 | 531 | |
| Original maintenance shop | 7000 | 9500 | |
| Warehouse, offices | 4867 | 6570 | |
| Bathhouse | 2253 | 4056 | |
| Rock dust storage bin | 29 | 78 | |
| Compressor | 93 | 252 | |
| Parking lot with asphalt berm | | | 2275 squ.yd. |
| Upper storage shed | 1417 | 2550 | |
| New shop and storage shed | 3718 | 6692 | |
| Sewage lagoon and pipeline (see bond prepared by regulatory authority on May 16, 1983, Chap. 3 of the PAP. Cost updated and included in the bond summary) | | | |
| New exhaust shaft and substation site (see bond prepared by regulatory authority on October 15, 1982, Chap. 3 of the PAP. Cost updated and included in the bond summary) | | | |
| Fencing | | | 1650 ft. |
| Powerlines (assume one mile) | | | 5280 ft. |
| 24 in. diam. culvert, 750 ft. | 87 | | |
| 30 in. diam. culvert, 725 ft. | 132 | | |
| half round 24 in. culvert, 600 ft. | 35 | | |
| Concrete lined ditches, 3 ft. wide, 613 ft. | | 1839 | |
| Asphalt ditches, 3 ft. wide 362 ft. | | | 121 squ.yd. |

Total steel = 22913 CY x \$4.05/CY = \$92800
 Total concrete demolition = 355583 SF x \$2.23/SF = \$79400
 Total concrete disposal (on site) = 6584 CY x \$4.63/CY = \$30500
 Asphalt = 2396 squ. yd. x \$1.38/squ. yd. = \$3310
 Fencing = 1650 ft. x \$1.13/ft = \$2280
 powerlines = 5280 ft. x \$3.62/ft = \$19100

STRUCTURES REMOVAL TOTAL \$227,000

*1 These are all steel structures. Cost for disposal is included in the unit cost.

*2 It was assumed that all structures had a concrete foundation. An average thickness of 6 inches was selected. Some of the areas will be thicker, however, this can be considered a reasonable average since the square footage is probably overestimated and some structures may not have a concrete foundation or may have a thinner foundation. It was assumed that all concrete would be disposed of in the mine or shaft.

BACKFILLING AND GRADING, TOPSOIL HANDLING

The applicant will be selectively handling material for topsoil during the backfilling and grading operation. Therefore these two operations have been grouped together. The volumetric analysis presented by the applicant on page 3-19 of the PAP was checked using the cross-sections in the PAP. Some variation in the numbers was found. However, the estimates provided by the applicant are reasonable.

The equipment productivity was evaluated by the reviewer using information provided by the applicant for volumes. Haul distances were determined by evaluating the amount of cut and fill in each area and determining where that material should be hauled to. A weighted average haul distance was calculated for all of the sites requiring grading (except the lagoon and new ventilation modification which have already been bonded). Then using information in the Caterpillar handbook, the time requirement for the Cat 950 loader was determined. It was found that the applicants estimate of 50 hours was reasonable. However, it was decided that two trucks would be needed to haul the material to "keep up with" the loader. The applicant has conservatively estimated the need for the other equipment, since these pieces of equipment will only be handling part of the backfill material, for special situations.

A D6 bulldozer has been added to the estimate for final grading and scarification for 50 hours. Since the costs determined by the reviewer include an equipment operator, the operator labor was dropped from the applicants estimate.

In summary the applicant's revised estimate is:

| | | |
|--|--------|--------|
| Grove Model Crane | 50 hrs | \$3660 |
| 955 Crawler Loader | 50 hrs | 3370 |
| D6 Bulldozer | 50 hrs | 3840 |
| Cat 950 Loader | 50 hrs | 4010 |
| 10 CY Rear Dump Truck (two of them) | 50 hrs | 5970 |
| 1 CY Backhoe | 50 hrs | 4840 |
| General Foreman | 50 hrs | 1570 |
| 3 Laborers | 50 hrs | 3290 |

BACKFILLING AND GRADING AND TOPSOIL HANDLING TOTAL \$30600

SEALING OF MINE OPENINGS

There is one ventilation shaft on the site and four slopes that will require closure. The shaft is 104 feet deep and will be filled in with concrete rubble from the site as will the shafts. The cost for demolition in the above calculations included disposal on site, so there is no additional cost for backfilling of these openings. Therefore, a minimal cost of \$1500/opening to place concrete stoppings or a concrete cap will be added to the bond.

$$\text{TOTAL COST} = 5 \text{ openings} \times \$1500 = \$7500$$

REVEGETATION

The revegetation costs proposed by the applicant are for the most part reasonable. The cost for labor has been increased to reflect the above noted rates. Costs for soil testing have been included and the hydroseeding has been increased to \$500.00/acre and mulching to \$150/acre based upon the reviewer's experience. Also a cost for hand planting of trees along the riparian zone has been added. The cost for soil sampling follows:

Assume 40 samples at the site to be collected using hand labor.
Sample collection will take one day.

$$\text{Cost} = (\$21.95/\text{hr labor} \times 8 \text{ hr}) + (\$48.00/\text{day for four wheel drive pickup}) + (5.05/\text{hour operating cost} \times 8 \text{ hours}) + (40 \text{ samples at } \$100.00/\text{sample}) = \$2460$$

The cost for planting of trees follows:

From the PAP, 2900 stems/acre will be planted in the one acre riparian zone acres over the site. Assuming that a laborer can plant one seedling in 20 seconds, and works 50 min/hour to allow time to return to the truck for additional seedlings, etc., then one person can plant 150 plants per hour.

$$\text{Cost} = [(2900 \text{ plants} / 150 \text{ plant/hr}) \times \$21.95/\text{hr labor}] + \$.67/\text{plant} \times 2900 \text{ plants} = \$2370$$

The applicant's revised cost = \$16300

$$\text{TOTAL REVEGETATION COST} = \$21100$$

RESTORATION OF THE STREAM CHANNEL

Restoration of 1950 feet of the stream channel in the mine area will be required. The applicant has proposed extensive riprapping to prevent erosion in the steep channel. A cross-section of the channel is shown on page 3-32 of the PAP. It is assumed that the coarse material will be able to be obtained on site. The quantity of this material (2340 CY) required accounts for approximately 10% of the total amount of backfill. There appears to be substantial quantities of sandstone material in the area to be able to sort out this amount. In addition, it is assumed that the channel will be graded in during the backfilling and grading operation.

Volume of material required:

15 in. of 1 ft. diam. riprap x 25 ft. around the channel = 1.2 CY/ft
4 in. of gravel x 25 ft. around the channel wide = .23 CY/ft

It is estimated that a D6 bulldozer will spend 4 days sorting out the coarse material and placing it.

Cost = \$76.87/hr x 32 hours = \$2460

The gravel will be purchased and spread on site using the bulldozer. Gravel cost per cubic yard = \$8.00/CY including a five mile haul, placement and spreading.

Cost = .23 CY/ft x \$8.00/CY x 1950 feet. = \$3590

TOTAL COST FOR CHANNEL RECONSTRUCTION = \$6050.

TOTAL COST FOR RECLAMATION OF THE MINE SITE = 292,000

WASTE DISPOSAL SITE

BACKFILLING AND GRADING

The waste rock disposal pile is to be constructed in horizontal lifts and built to the final contours as material is placed. As such, there should be very minimal grading required to contour the area for reclamation. It is assumed here that on the average approximately 2 feet of the material on the surface will require handling. The total area of the waste pile is 12 acres, therefore, 38700 CY could require grading. It is assumed here that a D6 Bulldozer will be used.

Bulldozer (average push distance is assumed to be 75 feet)
hourly production = 425 CY/hr x .75 average operator x .84 job
efficiency = 268 CY/hr
hours required = 38700 CY / 268 CY/hr = 144 hours
cost = \$76.87/hr x 144 hours = \$11100

This work by the bulldozer will also accomplish the "rubblization" of the surface material that the operator has stated will need to be done (page 7 of the soils report in the Aug. 1, 1984 submittal).

TOTAL COST FOR GRADING OF THE DISPOSAL SITE = \$11100

TOPSOIL REPLACEMENT

The applicant has calculated the topsoil replacement costs based upon the placement of 16 inches of material over the site. The applicant's proposal was reviewed assuming that the entire amount of material would have to be replaced on the disposal site, that is 46,131 CY. The distance that this material must be hauled is approximately 600 feet. The applicant's equipment requirements were checked using the Caterpillar handbook and found to be adequate. However, the hourly rates were revised. The final bond amount is:

TOTAL AMOUNT FOR TOPSOIL REPLACEMENT = \$29500

REVEGETATION

The revegetation cost proposed by the applicant are for the most part reasonable. The cost for labor has been increased to reflect the above noted rates. Costs for soil testing have been included and the mulching to \$150/acre based upon the reviewer's experience. Also, the applicant did not include the cost for reclamation of the topsoil storage area, 1.5 acres. This cost has been added to the applicant's cost.

The cost for soil sampling follows:

Assume 40 samples at the site to be collected using hand labor.

Sample collection will take one day.

Cost = (\$21.95/hr labor x 8 hr) + (\$48.00/day for four wheel drive pickup) + (5.05/hour operating cost x 8 hours) + (40 samples at \$100.00/sample) = \$2460

The applicant's revised cost = \$19300

TOTAL REVEGETATION COST = \$21200

RECLAMATION OF THE PUBLIC ACCESS ROAD AND THE SEDIMENT POND

The applicant's estimate was reviewed and found to be adequate. However, the hourly rates were revised. The final amount for reclamation of these areas is \$12700.

TOTAL COST FOR RECLAMATION OF THE ROAD AND POND = \$12700

RESTORATION OF THE STREAM CHANNEL

Restoration of 2700 feet of the stream channel in the disposal area will be required. The applicant has proposed extensive riprapping to prevent erosion in the steep channel. A cross-section of the channel is shown on page 3-32 of the PAP. It is assumed that the coarse material will need to be purchased, since there is no substantial fill to be handled on site that can be considered durable. It is assumed that the channel will be graded in during the backfilling and grading operation.

Volume of material required:

15 in. of 1 ft. diam. riprap x 25 ft. around the channel = 1.2 CY/ft
4 in. of gravel x 25 ft. around the channel wide = .23 CY/ft

Cost for coarse riprap = \$43.00/SY x (2700 ft. x 25 ft.)/9
= \$322000

The gravel will be purchased and spread on site using the bulldozer. Gravel cost per cubic yard = \$8.00/CY including a five mile haul, placement and spreading.

Cost = .23 CY/ft x \$8.00/CY x 2700 feet. = \$4970

TOTAL COST FOR CHANNEL RECONSTRUCTION = \$327000.

TOTAL COST FOR RECLAMATION OF THE WASTE DISPOSAL SITE IS \$401000

MAINTENANCE

This operation is critical to be able to assess the success of the revegetation efforts and to determine if any repair measures for rills and gullies and/or areas where vegetation did not take are needed. It is assumed that an inspector will be needed to look at the site once a year for the 10 year responsibility period but that the vegetation will be essentially established by the fifth year.

Inspector:

1 day per year at \$31.33/hr for 10 years = \$2510

Per diem @ \$50.00/day = \$50

Assume the car used will be a company car.

Repair of rills and gullies:

1 day per year: labor = \$21.95/hr x 8 hr x 5 yr = \$878
 tractor = \$80.00/day x 1 day x 5 yr = \$400
 revegetation = \$200.00 x 5 yr = \$1000

Reseeding:

Assume that 20% of the area will require reseeding for the first two years. Total reclaimed acreage is approximately 11.5 acres. Use hydroseeding as \$500.00/acre.

11.5 acres x .2 x 2 x \$500/acre = \$2300

TOTAL COST FOR MAINTENANCE = \$7140

ATTACHMENT 1 - SUMMARY OF REFERENCES USED IN THE BOND ESTIMATE

The following costs were taken from the Means 1984 Building Construction Cost Data.

Building Removal

steel - \$4.05/CY
concrete slab, 4 in. - \$2.23/square foot for demolition plus
\$4.63/CY for disposal
pavement - \$1.38/square yard
chain link fence - \$1.13/ft

Fill material - sand and gravel, \$8.00/CY
Riprap material - \$43.00/squ. yd.
4-wheel drive pick-up - \$48.00/day + \$5.05/hr operating

Equipment costs were taken from the 1984 Rental Rate Blue Book. The hourly rates shown below are the monthly rates divided by 176, plus operating expences, and plus an operator at \$28.45/hr.

D6 Bulldozer - \$76.87

Rental rates for the tractor were estimated.

Equipment productivity was determined from the Caterpillar Performance Handbook, Edition 12, except where noted in the analysis as "estimated".

The following unit costs were determined from the above references and estimates for productivity.

Removal of powerlines

2 laborers @ \$21.95/hr x 8 hr/day = \$351/day
1 D7 dozer @ \$106.69/hr x 8 hr = \$854/day
20 CY truck @ \$94.45/hr x 8 hr = \$756/day
4 CY loader @ \$93.85/hr x 8 hr = \$751/day

If 750 feet are removed per day, the cost per foot is \$3.62