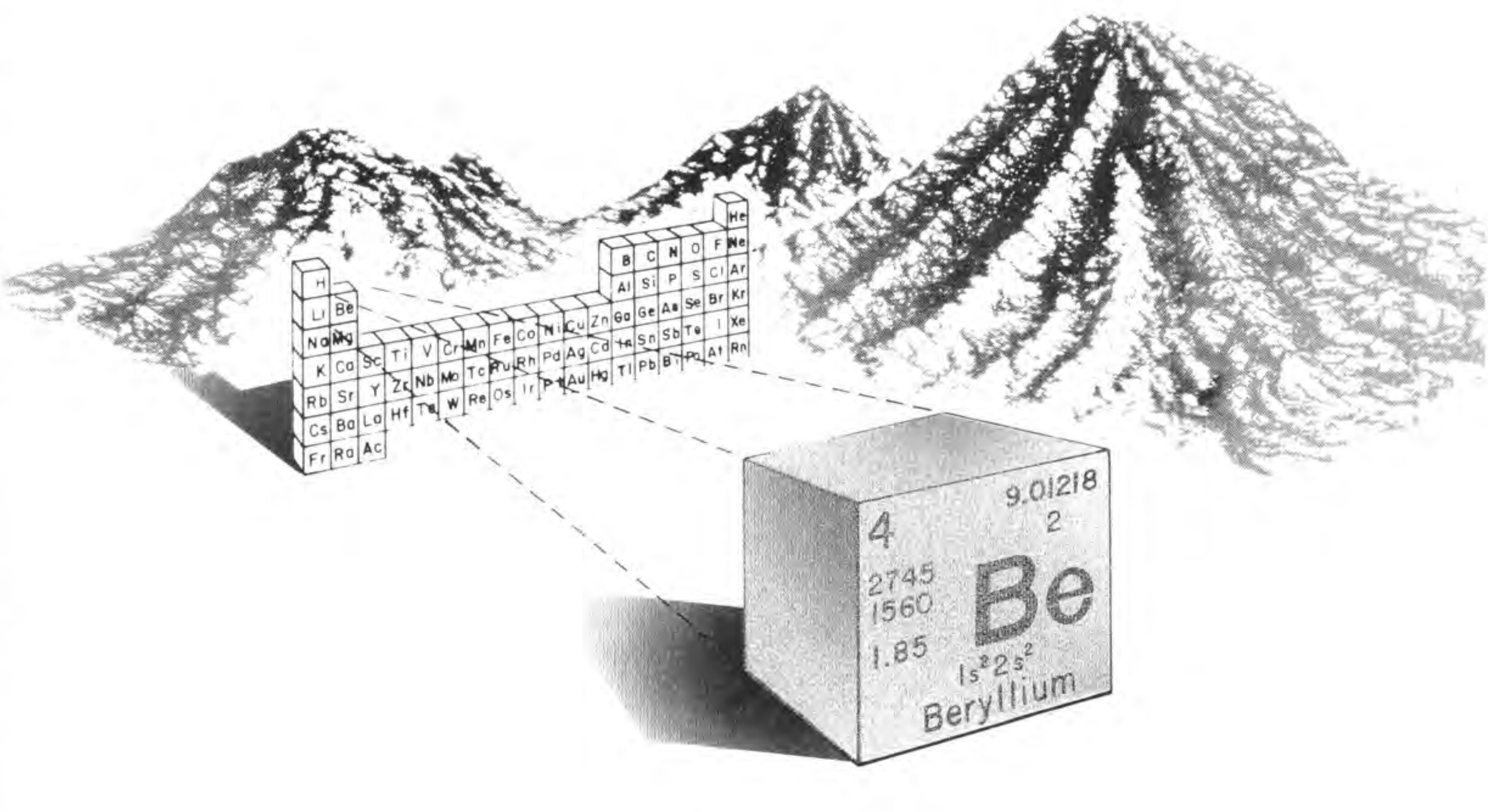
Cyprus Sierra Blanca, Inc.

PROJECT DEVELOPMENT PROGRAM
SIERRA BLANCA BERYLLIUM PROJECT

Exploration - Process Development
Feasibility Report



March 1988

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Copy No. 22

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Exploration – Process and Development

Feasibility Report

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REFERENCE DOCUMENTS

Mine Feasibility Study, January 18, 1988, by American Mine Services, Denver, Colorado

Preliminary Feasibility Study Sierra Blanca Beryllium Project, by Stearns-Roger, Denver, Colorado

West End Structure Status Report, Dated October 28, 1987 and December 4, 1987, Cyprus Geological Staff, Sierra Blanca, Texas

Process Development Report, by Cyprus Project Staff, Denver, Colorado

Capital Cost Development Report, by Cyprus Project Staff, Denver, Colorado

Operating Cost Development Report, by Cyprus Project Staff, Denver, Colorado

PROJECT DEVELOPMENT PROGRAM

SIERRA BLANCA BERYLLIUM PROJECT

Exploration -- Research and Development

Feasibility Report

INTRODUCTION

Interest in the Sierra Blanca area was first generated by W. N. McAnulty, Sr. in 1969, primarily for fluorspar. McAnulty, with various sponsors, drilled approximately 22 holes and dug prospect trenches on Round Top Mountain, Little Blanca Mountain and Little Round Top Mountain between 1971 and 1980.

The Cabot Corporation became interested in the Sierra Blanca area during 1982 when beryllium anomalies were discovered by a U.S.-wide beryllium geochemical reconnaissance survey. Subsequent mapping and sampling programs led to the establishment of a land position in 1984, with about 44 square miles of land obtained through state prospecting permits and private leases. A reverse circulation rotary drilling program commenced on Round Top Mountain late in 1984.

In January, 1987, Cyprus Metals Company entered into a joint venture agreement with the Cabot Corporation to continue beryllium exploration in the Sierra Blanca Project area. Focus was on the West End Structure, Round Top Mountain, as this structure was believed to contain the highest concentration of beryllium at the best ore grades "identified" on the property to-date. This exploration included driving a decline to the mineralized zone and surface and underground drilling.

Photographs are included in this section to show our entry into the Sierra Blanca Project area, the exploration activities on Round Top Mountain, the decline which was driven and the orebody which was intercepted.

A Project Development Program was established for the Sierra Blanca Beryllium Project to determine the values of the natural resources, the application of proven process technologies to recover beryllium, and the capital and operating cost requirements to achieve such recoveries. The Development Program included the following:

* Geological studies, drilling programs, resource evaluation.
* Mine Feasibility studies.
* Process studies, laboratory test programs.
* Mill feasibility studies.
* Capital and operating cost estimates.
* Environmental-permitting-human resource evaluations.
* Mineral-land position, acquisitions.
* Financial analysis.

The geological studies included reviews of the previous programs conducted by the Cabot Corporation, and new drilling programs to confirm and expand the proven reserves.

The driving of the decline and drifting, to permit underground drilling, provided site specific information useful for the preparation of mine feasibility studies and the mining of a 1,000 ton bulk sample.
Process studies, supported by laboratory test programs, confirmed the

suitability of the acid leach/solvent extraction process for the recovery of beryllium values. Column leach tests, conducted late in the program, provided encouraging results for an alternate process to handle below cutoff grade ore.

Mineral and land acquisition efforts were mobilized. The results of numerous contacts with both Texas State officials and current land owners have been evaluated. Action items are now defined based upon specific requirements produced by the Development Study programs.

Environmental considerations have been identified and established as the criteria for the mine and mill design programs. Monitoring programs during the year, plus the meetings with Texas State agencies have determined the permitting program requirements which have been incorporated into the project schedule. Human resource considerations have been established. Programs to achieve acceptable levels of environment have been demonstrated.

Financial studies have been prepared using the capital and operating cost values determined by the mine and mill feasibility studies. Conservative marketing values were selected from data provided by the Cabot Corporation and from current price information provided by Advanced Metallurgical & Testing Company. The marketing program for the beryllium hydroxide product, current and projected activities, have not been included in this report.

Certain documents have been reproduced from the feasibility studies conducted by American Mine Services and Stearns-Roger, and have been so noted. The balance of the calculations, tables and drawings were produced by the Cyprus Project Staff. The detailed studies of the Project Development Program are available on request.

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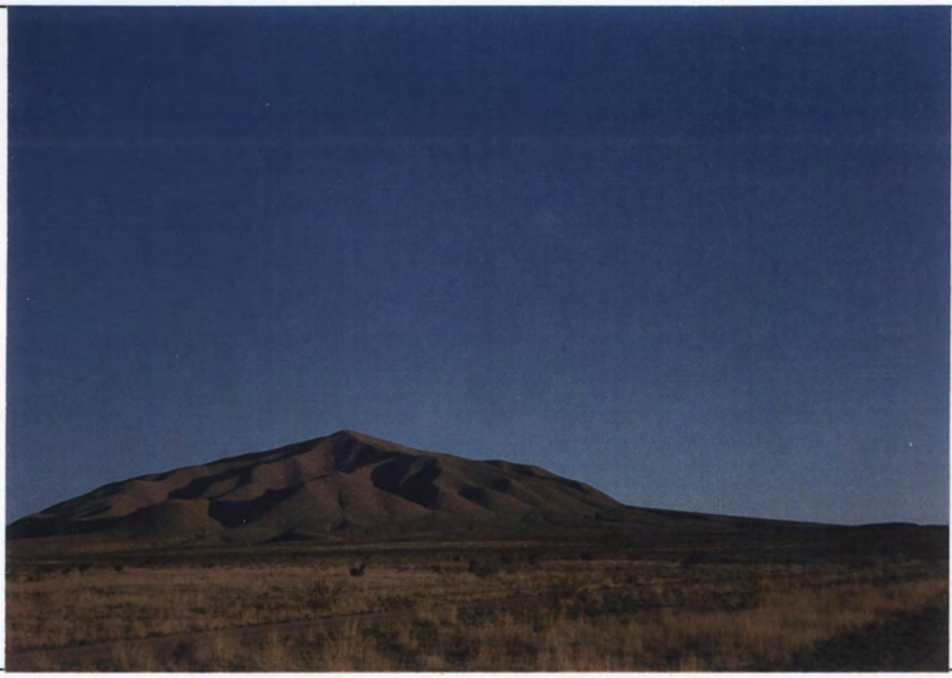
Sierra Blanca Mountain



Round Top Mountain - Exploration

Decline - Access To Ore Body

Ore Body - BeO Assay Values

0.1 0.77 5.95 3.7 0.21

EXECUTIVE SUMMARY

Geological studies, including both surface and underground drilling programs, have confirmed high grade ore reserves. Our efforts concentrated only on a limited portion of the West End Structure of Round Top Mountain. Values of proven, probable and possible reserves, correlated with % BeO ore grades were originally established by the Cabot Corporation. Subsequent evaluations by the Cyprus geological staff and American Mine Services professional services have assessed the orebody and have reported very similar results. Because of the confirmation drilling, the three independent assessments, and the degree of study given by each, our confidence level is high when we predict 298,000 tons of ore which will yield 11,000,000 lbs. BeO at an average ore grade exceeding 1.9% BeO.

The mine feasibility study confirmed ore reserve values. This study also produced a unique mining plan, tailored to the characteristics of the ore reserve, yielding optimum, economical recovery with a minimum of dilution. Recognizing the impact on milling costs and recovery, the mining plan provides for selective mining to thus assure overall economical costs.

The mill feasibility study criteria, established prior to the completion of the drilling, assay and mine feasibility work, developed costs for a 1,000,000 lb/yr. BeO plant at an established feed grade of 1.5% BeO. Subsequent studies at higher feed grades, proven achievable, demonstrate clearly the financial benefits of having a high grade ore feed. We are keenly aware of the average ore grade of the Brush Wellman Utah operations (0.65%) and their production costs. Again we are confident that we can place our beryllium hydroxide product on the marketplace at a most competitive producer's price.

The handling of below cutoff grade ore was addressed, due primarily to environmental considerations. This ore must be removed from the mine due to the optimized mine plan to be followed -- narrow drifts, very little underground storage, in a constantly advancing mining campaign. If stockpiled and untreated, the exposure to weather and the winds will cause airborne particulate problems that cannot be allowed. Two simple column leach tests, conducted late in the Development Program, established 60% recovery values in two months time. We are encouraged by such tests that indicate satisfactory beryllium reductions can be achieved in the below cutoff grade ore while generating an additional revenue stream.

A General Plan of the Sierra Blanca Project has been prepared showing the relative locations of the various mountains and their named reserves. Access roads and power line extensions have also been shown. An expanded plan has also been developed showing the relative locations, for the preferred Site "A", of the two mine portals including their associated mine equipment, as well as the mill site, tailings disposal area, and the heap leach area. These general plans are included as Figures No. 1 and No. 2, included in this section.

Conclusions and Recommendations

Following are conclusions and recommendations derived from the individual studies and assessments.

* We have defined a viable orebody. High grades of BeO equivalent values are present (average values +2.0% BeO), such as to present a considerable production cost benefit over the industry competitor, Brush Wellman.
* A unique mine plan has been prepared providing for optimum recovery, with minimum dilution, at economical values.
* The metallurgical process plan assures high beryllium recovery at low competitive costs. Product quality has been demonstrated. The process and equipment to achieve or better the environmental standards has been defined and incorporated into the project plans.
* Project economics are most favorable.
* The producing of a hydroxide product is a most significant link in the beryllium industry chain. Potential clients have indicated their welcome to a second supplier. The long range strategy and success of the AMT Corporation also is enhanced by the production of the beryllium hydroxide product of Sierra Blanca.
* The conversion to beryllium metal is another process link in the beryllium chain now controlled by the industry leader, Brush Wellman. Conversion scenarios such as fused salt electrolysis have been suggested as a new method to produce beryllium metal much like the practice used in the conversion of lithium metal. It is quite possible with our new relationship established with Foote Minerals that we may develop the new conversion technology so much in demand in the beryllium industry.
* Utilizing a heap leach process for treating the primary ore can be accomplished at a considerable reduction in capital expense. This cost reduction, actually a deferred cost, while providing a reduced amount of hydroxide product at a reduced process recovery value, may well become the best strategy for market entry at minimum capital cost. Heap leach testwork is required. Estimated values of cost and time will be submitted for management review and approval.

CAPITAL COST SUMMARY

1,000,000 Lbs/Year BeO Plant

Mine-Mill -- Infrastructures -- Property/Mineral Acquisitions

1.	Mine Facilities (AMS Study and Cyprus Capital Cost Development Report)	$ 4,054,600
2.	Mill Facilities (SR Study and Cyprus Capital Cost Development Report)	8,686,400
3.	Tailings System (Cyprus Capital Cost Development Report)	1,075,000
4.	Infrastructure (Cyprus Capital Cost Development Report)	1,461,100
5.	Property and Mineral Acquisitions (Cyprus Capital Cost Development Report)	502,400
	Total Capital Cost	$15,779,500

300,000 Lbs/Year BeO Plant

Mine-Mill -- Infrastructures -- Property/Mineral Acquisitions

1.	Mine Facilities (AMS Study and Cyprus Capital Cost Development Report)	$ 3,805,670
2.	Mill Facilities (SR Study and Cyprus Capital Cost Development Report)	6,448,000
3.	Tailings System (Cyprus Capital Cost Development Report)	350,000
4.	Infrastructure (Cyprus Capital Cost Development Report)	1,461,100
5.	Property and Mineral Acquisitions (Cyprus Capital Cost Development Report)	502,400
	Total Capital Cost	$12,567,170

OPERATING COST SUMMARY

Item	1,000,000 Pound Per Year		300,000 Pound Per Year	
Mine	$1,980,288		$660,965	
$ Per Ton		69.78		85.29
$ Per Lb. BeO		1.98		2.20
Mill	3,254,114		$1,415,924	
$ Per Ton		124.18		182.70
$ Per Lb. BeO		3.52		4.72
G&A	1,207,777		801,556	
$ Per Ton		42.56		103.43
$ Per Lb. BeO		1.21		2.67
Total	$6,712.179		$2,878,445	
$ Per Ton		236.51		371.41
$ Per Lb. BeO		6.71		9.59

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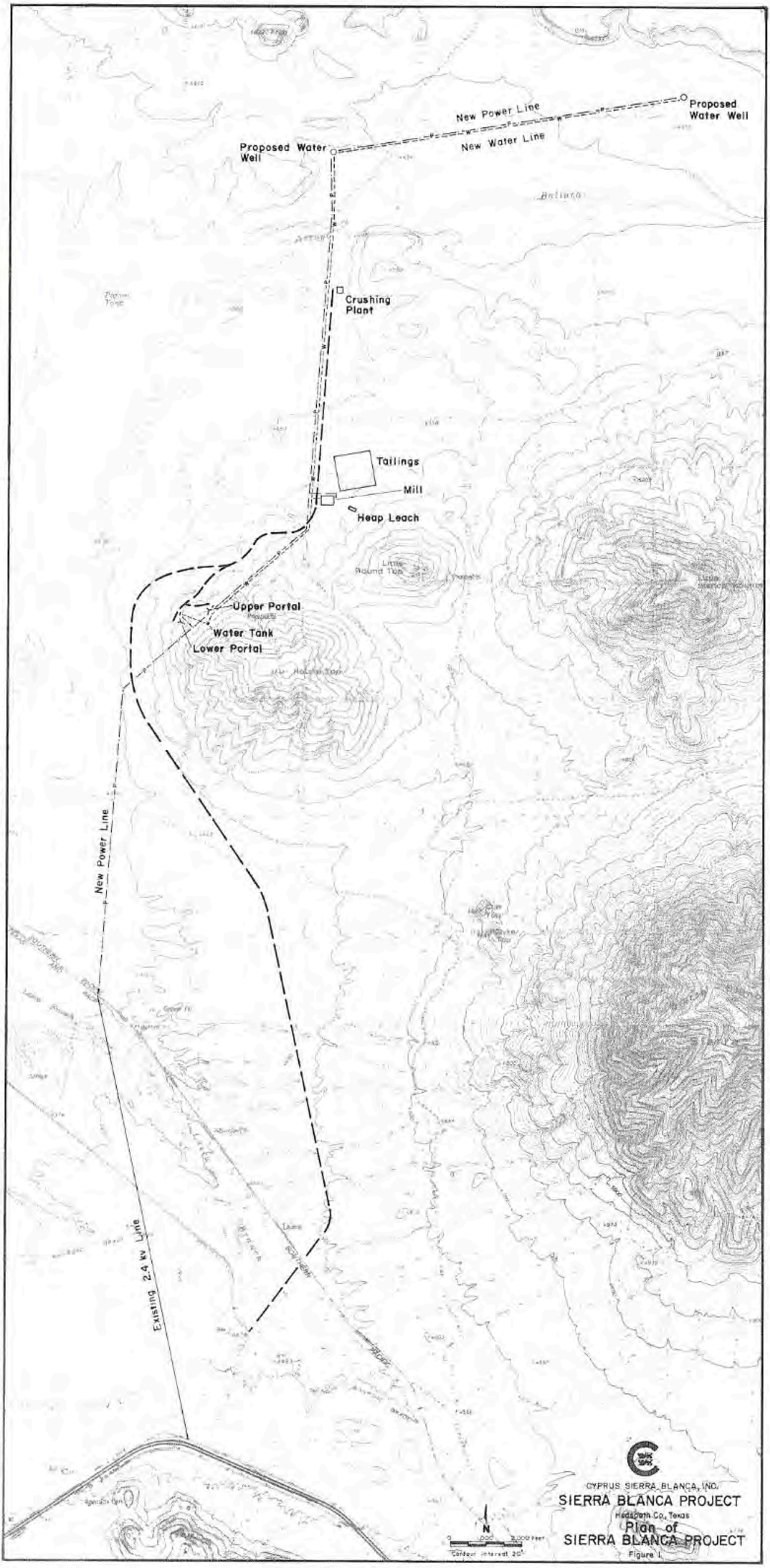
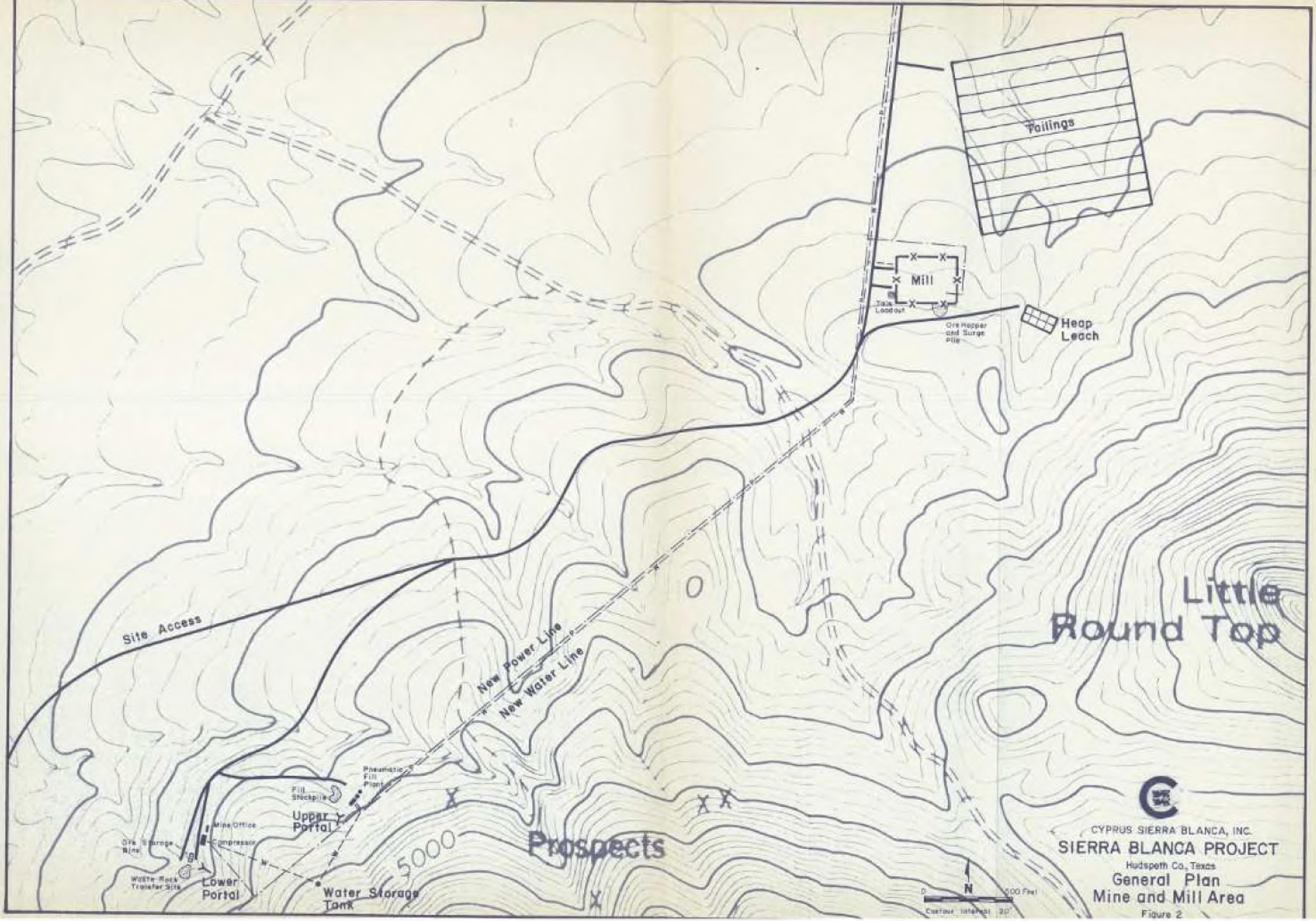


New Power Line
Proposed Water Well
New Water Line
Proposed Water Well
Crushing Plant
Tailings
Mill
Heap Leach
Little Round Top
Upper Portal
Water Tank
Lower Portal
New Power Line
Existing 2.4 kV Line
CYPRUS SIERRA BLANCA, INC.
SIERRA BLANCA PROJECT
Hudspeth Co., Texas
Plan of
SIERRA BLANCA PROJECT
Figure 1
N
Contour interval 20'



Tailings
Mill
Ore Hopper and Surge Pile
Heap Leach
Little Round Top
Site Access
New Power Line
New Water Line
Pneumatic Fill Plant
Fill Stockpile
Upper Portal
Mine Office
Compressor
Ore Storage Bins
Waste Rock Transfer Site
Lower Portal
Water Storage Tank
5000
Prospects
N
0
500 Feet
CYPRUS SIERRA BLANCA, INC.
SIERRA BLANCA PROJECT
Hudspeth Co., Texas
General Plan
Mine and Mill Area

Figure 2

GEOLOGICAL STUDIES

The Sierra Blanca Project area lies within the Texas Lineament Zone or Trans-Pecos Trend. The lineament is a Northwest trending structural zone where Laramide thrust faulting followed by basin and range normal faulting were active. Tertiary igneous activity is also associated with the lineament zone, both intrusive and extrusive.

Locally, the project area is characterized by five Tertiary microgranite bodies that intruded Cretaceous sedimentary rocks. The microgranites occur as laccoliths, mushroom-shaped bodies emplaced at relatively shallow depths, see Figure 3 included in this section of the report. At the present erosional level, the laccoliths form resistant peaks with relief up to 2,000 feet. Chemically, the microgranites are enriched lithium, beryllium, fluorine, zinc, rubidium, yttrium, zirconium, niobrium, tin, thorium, molybdenum and rare earth elements which are similar to topaz-bearing thyolites. To date only beryllium appears to occur in economic concentration. The peaks are: Sierra Blanca Mountain; Little Blanca Mountain; Round Top Mountain; Little Round Top Mountain and Triple Hill.

Tertiary diorite that pre-dates the microgranite intruded the Cretaceous section. The diorite occurs as sills, five to 100 feet thick and less frequently as dikes and plugs.

Sedimentary rocks exposed in the area are lower and middle Cretaceous limestones, shales and sandstones. The limestones, where in contact with microgranite, are hosts for beryllium mineralization.

Normal high angle faulting was active throughout the Sierra Blanca area, both pre-and post-intrusive. Faults generally trend northwest with local displacements up to several hundred feet. Low angle thrust faults have been mapped in the southern portions of the project area (south side Sierra Blanca Mountain). In the northern areas, diorite sills and microgranite intrusive contacts may be along these thrust faults.

Mineralization

Beryllium mineralization within the Sierra Blanca District is thought to be the result of magmatic, hydrothermal fluids leaching beryllium and fluorine from the microgranite source rocks and redepositing them in chemically reactive limestones. This mineralization occurs as replacement bodies in limestone along the microgranite-limestone contacts and as veins that emanate from microgranite-limestone contacts. In addition, mineralization can occur as replacements in favorable limestone beds and along faults. Beryllium minerals identified in Round Top Mountain ore are bertrandite, behoite, phenakite, chrysoberyl and berborite.

Exploration 1984 through 1986 -- Cabot Corporation

The Cabot Corporation initiated a reverse circulation rotary drilling program on Round Top Mountain in October, 1984. During the period from October, 1984 to December, 1985, 240 holes totaling 69,650 feet were completed.

Exploration emphasis was on Round Top Mountain where 153 holes were drilled. A relatively flat-lying mineralized zone was discovered at the microgranite-limestone contact beneath the northwest portion of the mountain. In addition, a near vertical brecciated contact zone was encountered beneath the west side of the mountain that later became known as the West End Structure see Figure 4 included in this section of the report. This structure was found to contain higher grades of beryllium mineralization than the flat-lying mineralization on Round Top Mountain.

Thirty-two holes were completed on the north side of Sierra Blanca Mountain in an area approximately 2,000' x 800'. High grade beryllium mineralization was encountered along a steeply dipping (50° -- 80°) microgranite-limestone contact. High angle fault zones that roughly parallel the microgranite contact were found to contain mineralization. In addition, low angle faults (thrusts?) in the limestone are mineralized and numerous high grade beryllium veins ranging from 2" to 15' are exposed on the surface.

Fifty wide-spaced holes were drilled on the north and west margins of Little Blanca Mountain laccolith. Mineralization is thin, generally 6" - 1.5' thick along the flat lying microgranite-limestone contact, but there are additional target areas that remain to be drilled.

Five holes were drilled on the North Hills, a small hill north of Little Blanca Mountain. Shale and sandstone is in contact with microgranite and the area is void of significant beryllium mineralization.

Following completion of the drilling programs, sufficient information had been obtained to calculate a geologic reserve estimate. In 1986 Cabot Corporation calculated a beryllium resource potential of 25,000,000 pounds BeO for areas drilled in the Sierra Blanca Project. The following table summarized results of this study:

1986 Cabot Corporation, Sierra Blanca Project ore resource estimate. Tonnages and grades are based on 12 Ft^3/ton density and an 0.5% BeO cutoff.

Area	Tons Ore	Pounds BeO	Grade BeO	Ore Classification
Round Top Mt.	569,700	16,125,000	1.41%	drill probable
Sierra Blanca Mt.	265,000	8,646,500	1.63%	drill possible/resource
Little Blanca Mt.	16,700	311,700	0.93%	resource
TOTAL	851,400	25,083,200	1.47%	

Exploration 1987 -- Cyprus Beryllium Corporation

Cyprus' exploration program was initiated January, 1987. Plans were drawn for a surface reverse circulation drilling program and driving a decline beneath Round Top Mountain into the West End Structure, because the structure appeared to have the greatest potential to produce an economically viable ore body. Cabot had calculated a reserve estimate of 9,000,000 pounds BeO for the West End Structure compared to 6,900,000 pounds BeO for the discontinuous, flat-lying mineralization on Round Top Mountain. In addition, favorable areas along the margins of Round Top Mountain and mineralization exposed on the surface of Sierra Blanca Mountain were evaluated for potential open pittable beryllium resources. By the end of November, 44 surface reverse circulation holes totaling 9,262 feet; two surface core holes totaling 347 feet, and 21 underground holes totaling 2,665.5 feet were completed; and 1,115 feet of decline, ore drifts and drill drifts were mined.

Exploration drilling for open pittable resources on Round Top Mountain was concentrated on the north side along margins of the laccolith where the microgranite-limestone contact is exposed on the surface. Drilling results indicated an erratic mineralized zone, dipping about 20° beneath the mountain. It was determined that fill-in drilling (on 50 foot centers) would be required to adequately assess the open pittable potential of this material. However, it does appear to be sub-marginal due to erratic mineralization and stripping ratio of 45:1.

The south side of Round Top Mountain was also explored for shallow mineralization. Drilling was blind as the laccolith dipped under colluvium cover. The target for mineralization was the microgranite-limestone contact where the limestone would lay above the laccolith as the microgranite thinned to the south. Drilling was somewhat of a success; limestone was found above the laccolith although mineralization encountered was weak and discontinuous.

High grade beryllium veins and fault controlled mineralization were explored with shallow drill holes on Sierra Blanca Mountain. Due to the steep nature of the mountain, drilling did not adequately test the surface mineralization. Trenching would be required across the strike of the veins to sample the veins and fault mineralization. This is now in progress.

The West End Structure is a near vertical, brecciated, highly mineralized contact zone beneath Round Top Mountain with assay grades up to 9% BeO. This contact zone between the microgranite intrusive and limestone country rock could only be properly evaluated through underground drilling, due to the depth of mineralization and the very difficult surface drilling conditions see Figure 5 included in this section of the report. The strike of the structure has been traced 1,200 feet and projected 2,150 feet by surface drilling. Dip lengths range from 250 feet near the center of the structure to 50 feet where the structure intersects the slope of the mountain.

Three surface rotary holes were drilled along the structure. One hole was drilled between previous holes to test the continuity of mineralization extending away from the structure in limestone. The other two holes that were wise spaced offsets (300' and 1,000') were designed to test the continuation and associated mineralization of the West End Structure. The 1,000' offset hole was collared near the possible microgranite vent zone. Limestone adjacent to the vent should be highly mineralized, due to increased structural preparation and a pathway for hydrothermal fluids. The hole showed weak mineralization but it may be hundred of feet away from the actual vent zone. With both holes encountering mineralization, the strike length of the structure can be projected to 2,150 feet with reasonable certainty.

Two core holes were completed along the proposed decline route. These holes were drilled to collect engineering data for rock quality determinations.

American Mine Services, Inc. began driving the 10' x 10' exploration drift to the West End Structure in April. The drift was driven to access the ore body, provide underground drill stations and determine mining conditions. Due to the highly fractured nature of the microgranite, a route in limestone below the microgranite contact was chosen, see Figure 6 included in this section of the report. When establishing the portal, the limestone was found to be highly fractured too. Ground support in limestone required steel sets on 5 foot centers with cribbing and lagging. When a diorite sill was encountered, it was found to be highly sheared and the fractures were generally open, not cemented together with clay and calcite as in the limestone. Ground support while drifting in diorite required steel sets on 5 foot and 2½ foot centers and spiling was set to hold the back from running. Mining in ore required steel sets with cribbing and lagging although the ore is more competent than the limestone and the diorite.

The decline was driven 829 feet plus the 38 foot portal to the hanging wall of the West End Structure. An 85 foot test mine was completed and 1000 tons of ore extracted as a bulk sample. The test mine was driven along the hanging wall to test continuity and variability or ore between two surface core holes. The ore was found to pinch and swell, 5' wide to 17' wide. Grades were found to be highly variable. 163 feet of drill drift were driven 80 feet from and parallel to the structure to accommodate underground drilling.

Underground drilling was initiated following completion of mining the drill drifts. American Mine Services, Inc. core drilled four holes, but high drilling costs and slow penetration rates forced the drilling program to be terminated. A reverse circulation drilling program was then commenced, utilizing a modified Cyprus Casa Grande rotary drill rig.

Fans of angle holes were drilled from four drill stations 50' apart, perpendicular to the strike of the West End Structure. Drilling was designed to test the thickness and grade of beryllium mineralization along the steeply dipping to vertical microgranite-limestone contact of the West End Structure. In addition, a fan of 5 holes was drilled parallel to the West End Structure in limestone 40 to 60 feet from the microgranite contact. This drilling was designed to test the grade and thickness of fracture-controlled beryllium mineralization emanating from the West End Structure at high angles.

Underground drilling revealed a generally continuous limestone replacement ore body along the near vertical microgranite-limestone contact. The ore pinches and swells both along strike and along dip. True ore thickness ranged from 3 feet to 25 feet at a 0.5% BeO cutoff. Ore grades are highly variable with the highest sample assaying 9.34% BeO over a 2½ foot drilled interval. The average grade for this portion of the structure is 2.91% BeO. Fracture controlled beryllium mineralization was found to be thin and very discontinuous. Fractures range from inches to 5 foot zones and grades are probably high (up to several percent BeO) but when diluted in a 2½ foot drill interval, they average 2.04% BeO. This mineralization can only be projected ten feet from the main mineralized zone with confidence.

West End Structure Ore Reserves

The Cyprus geologic staff calculated ore reserves for the West End Structure following completion of underground drilling using standard cross sectional reserve estimating methods. Cross sections were generated on 50-foot centers for the entire length of the structure and ore zones were drawn based on geology and drill hole intercepts. The strike length of the West End Structure is estimated to be 2,150 feet. For calculating ore reserves the strike length was treated as three separate areas:

1. Cross sections 400 to 550, area of closely spaced underground drilling, reserves classified as proven + probable.

2. Cross sections 50 to 350 and 600 to 950, area of wide-spaced surface drilling, reserves classified as possible.

3. Crosssections 1,000 to 2,150, projected distance of the structure based on 2 drill holes and geologic interpretation, reserves classified as possible.

West End Structure ore reserves, based on 0.5% BeO cutoff, and 12 Ft^3/ton density are summarized below:

Area	Tons Ore	Pounds BeO	Grade BeO	Ore Classification
Sec. 400 to 550	35,441	2,063,345	2.91%	proven + possible
Sec. 50 to 350 & 600 to 950	109,140	3,527,206	1.62%	possible
Sec. 1,000 to 2,150	153,911	5,765,230	1.87%	possible
TOTAL	298,492	11,365,781	1.90%	proven, probably & possible

Cabot projected reserves (March, 1986) for 375 to 575 feet totaled 3,363,100 pounds BeO compared to 2,063,345 pounds BeO defined by Cyprus underground drilling. This 37% decrease in pounds is attributed to a narrower ore body and a steeper dipping structure than originally interpreted from surface drilling.

Densities of 12 Ft^3/ton used in reserve calculation may be high. Test mining indicated densities of 16.9 Ft^3/ton which may be low due to errors during ore separation, loading and hauling. True ore density is probably somewhere in between. Reserve estimates will be changed when real numbers become known.

Potential exists for additional areas containing higher amounts of BeO mineralization along the West End Structure similar to the area 375 to 575 feet. Limited vertical drilling from the surface along the remainder of the structure is inadequate to predict their presence. Total West End Structure reserves could be increased to 17,600,000 pounds BeO if additional high grade areas are present.

As part of the mine feasibility study, American Mine Services, Inc. was instructed to evaluate and verify Cyprus' geologic interpretations and ore reserve estimates. An independent evaluation of the area 375 feet to 575 feet was completed by David Jonson/AMS using mineral contouring techniques. This evaluation verified the basic interpretations completed by Cyprus and qualified their ore reserve estimates as conservative.

The results obtained by AMS kriging methods in estimating the mineable ore reserves for this area also confirm both the Jonson and Cyprus results. The proven and probable ore reserves of each of the three estimates for the area 375 feet to 575 feet at a 0.5% BeO cutoff is tabulated below.

	Tons Ore	Pounds BeO	Grade BeO
Cyprus Be @ 12/04/87 (geological)	35,441	2,063,345	2.91%
AMS (D.Jonson) @ 1/08/88 (geological)	51,592	2,423,468	2.35%
AMS Kriged @ 1/08/88 (mineable)	57,024	2,246,559	1.97%

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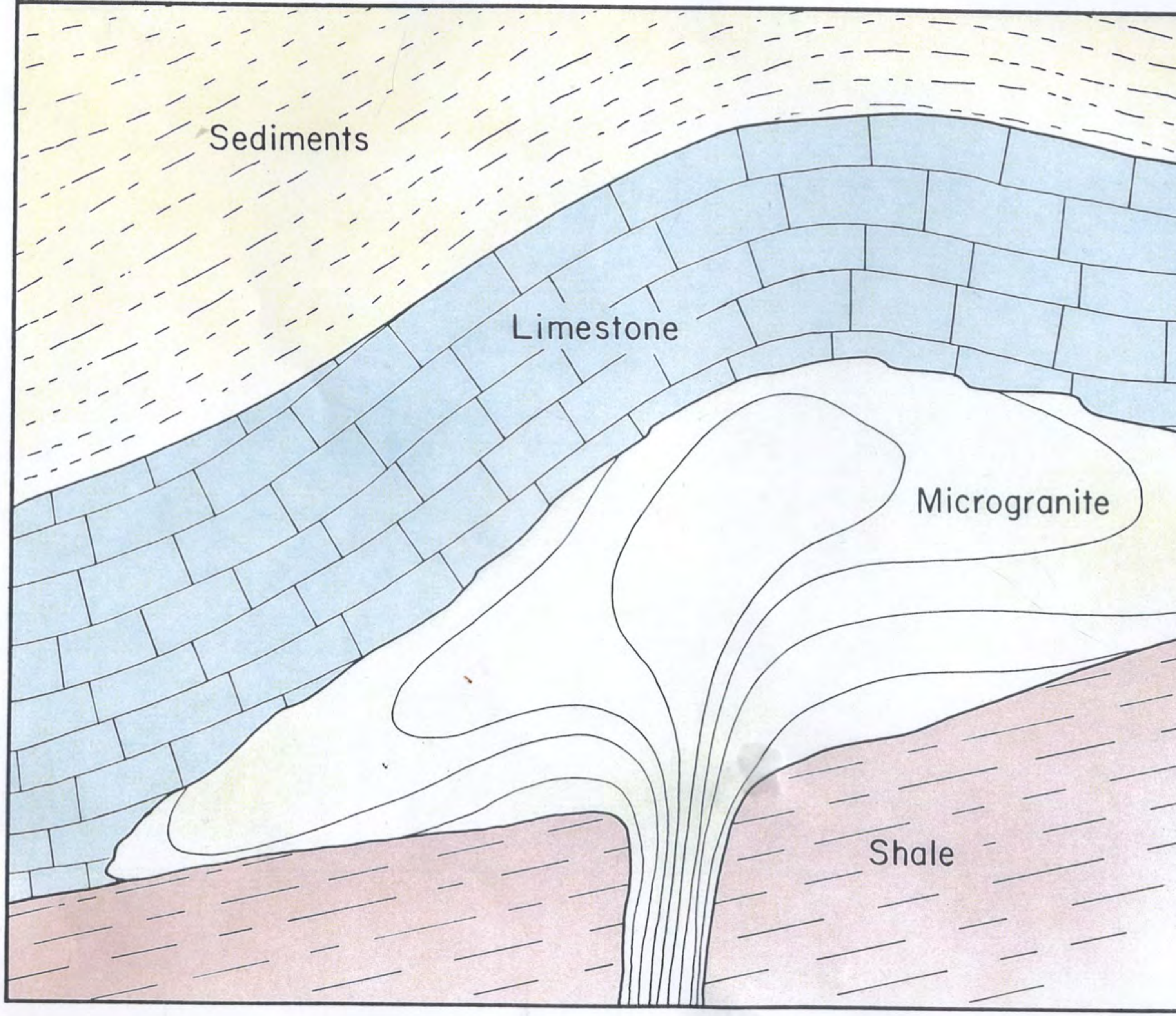
LACOLITH GEOMETRY



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HUDSPETH CO., TEXAS

FIGURE 3

ROUND TOP MOUNTAIN CROSS SECTION

Showing Exploration Drilling

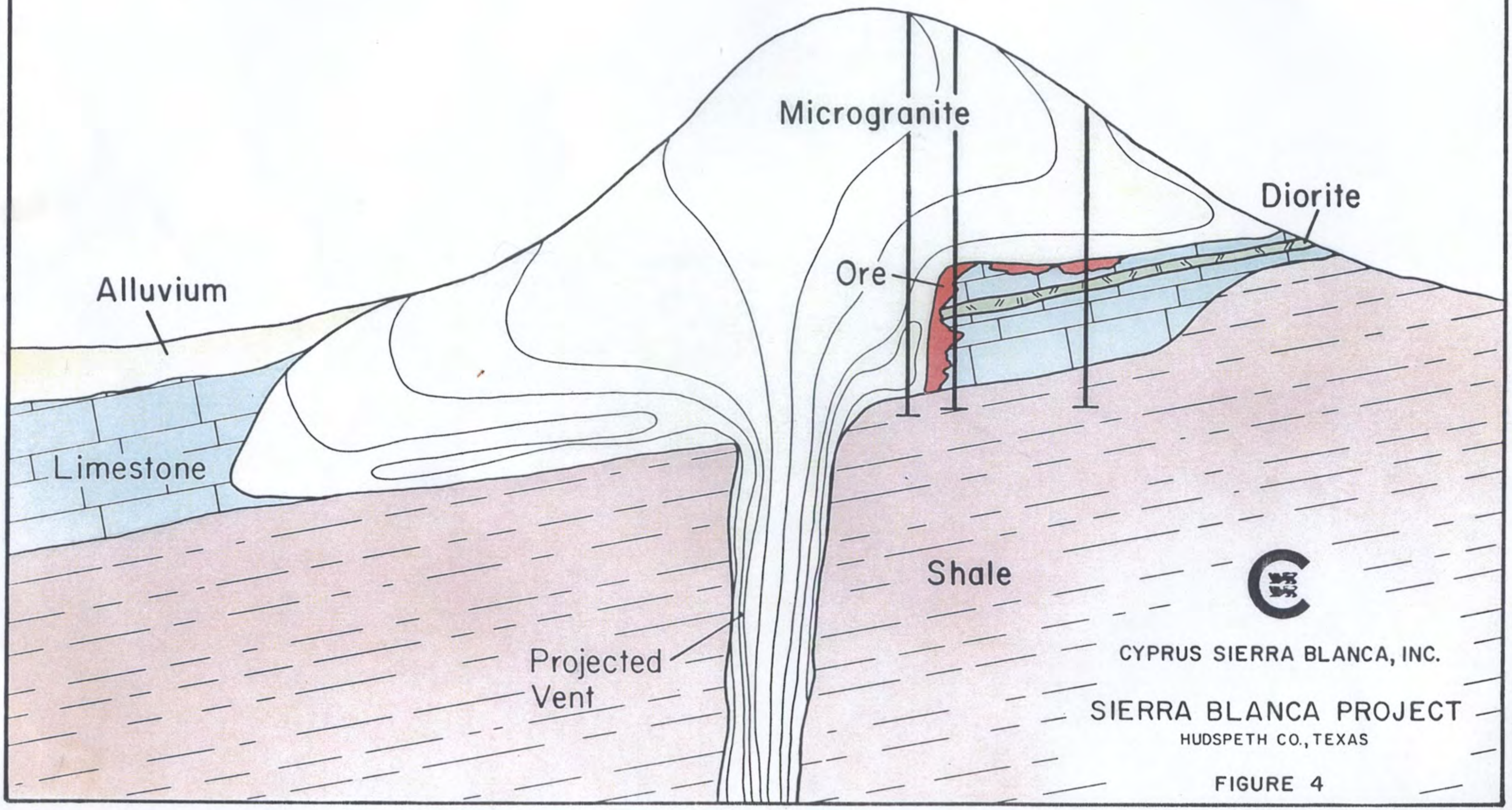
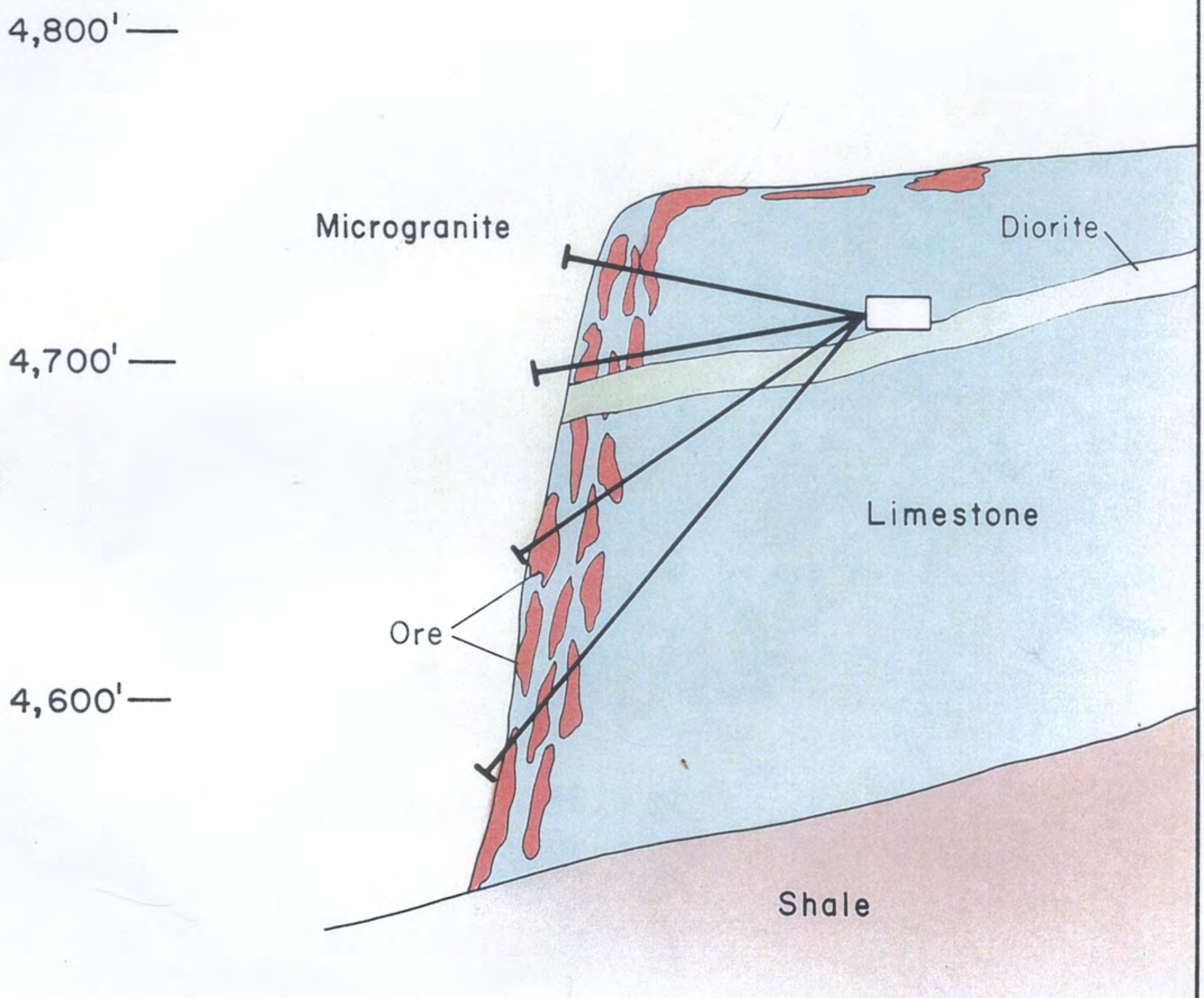


FIGURE 4

WEST END STRUCTURE
Cross Section
Showing Underground Drilling



0 50
Feet

CYPRUS SIERRA BLANCA, INC.

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HUDSPETH CO., TEXAS

FIGURE 5

CROSS SECTION ALONG EXPLORATION DRIFT
Showing Relative Geology

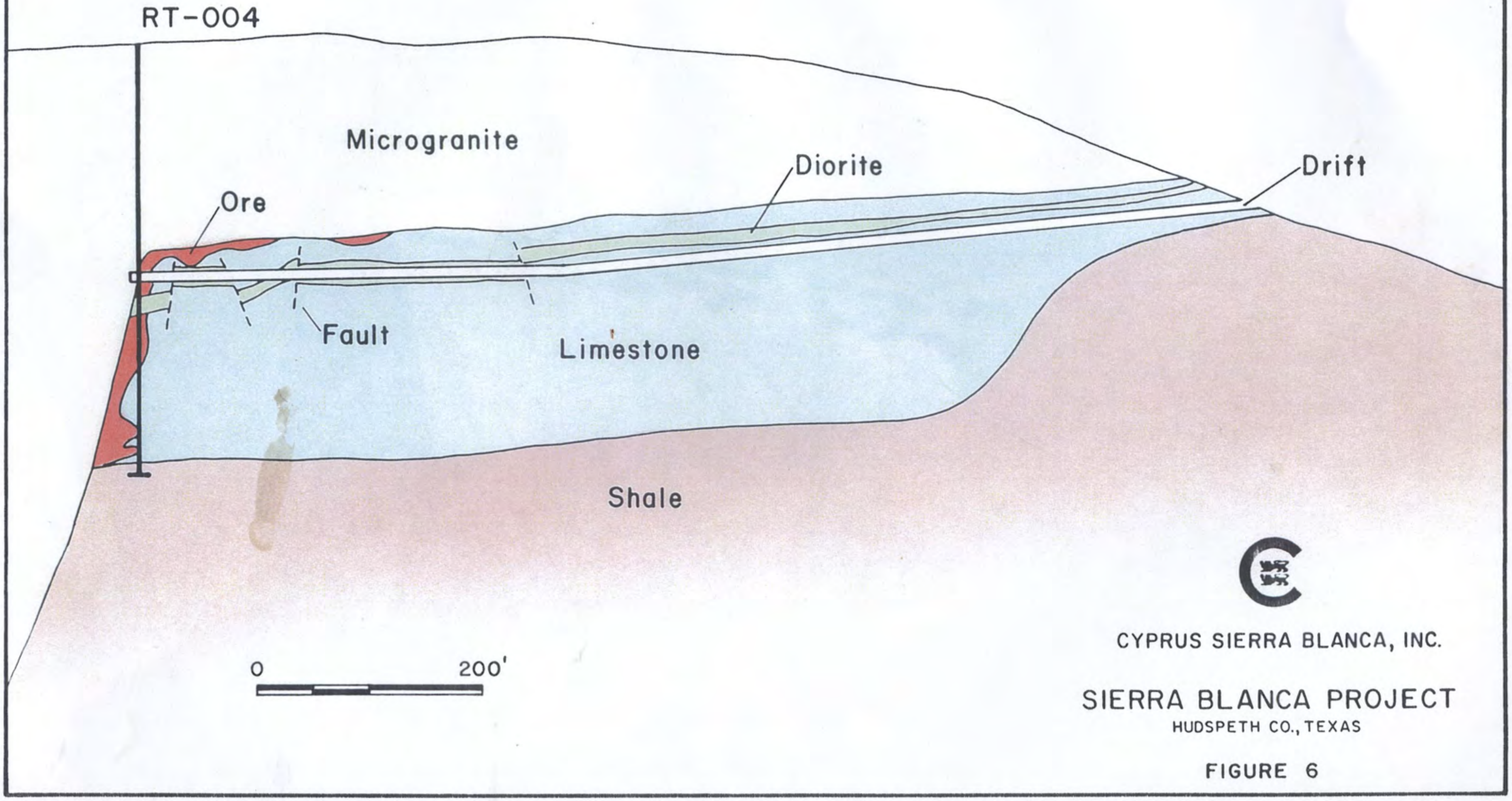

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FIGURE 6

MINE FEASIBILITY STUDY

The decision was made to drive a decline into the orebody to allow close spaced drilling and a more favorable angle of drilling. This would allow us to make an accurate assessment of the tons and grade of ore contained in the structure. It would also allow a more reliable estimate of ore reserves in the extension of the orebody which had only been drilled from the surface. We planned to take a bulk sample of the ore, determine the amount of support which mine openings would require, learn what mining costs to expect if a mine were established, and determine what respiratory protection and other measures would be needed to protect miners from the hazards of beryllium dust.

The workmanship of decline was maintained at a high level with the knowledge that it would probably provide important access to the orebody for the life of the mine. Grade was maintained at 12% or less, support sets were carefully aligned, a smooth road surface was maintained, pipe and vent ducting were neatly and securely fastened and all the sets were fully lagged with 2 x 12 timber. A total of 1,115 feet of decline, ore drifts, and drill drifts were mined.

To prevent accidental exposure to beryllium dust during mining, all new situations were approached with maximum protection for the miners. This meant the use of battery powered air filtering units which were worn on the belt, and which blew purified air through a hose into the face mask worn by the miner. These units were very effective, but were costly to purchase and operate. In addition, they were a very major inconvenience to the miners in difficult working conditions. Communications were close to impossible. As soon as testing could verify that the beryllium dust level was low enough, these PAPR units were set aside in favor of simpler respirators until the next situation arose. It appears that only during the ore loading process will the PAPR units be required.

We used a negative ventilation system to maintain a safe mine environment Fresh air was drawn into the decline at the portal by negative pressure. At the end of the decline, the dusty smokey air was drawn into a rigid 36 inch diameter ventilation duct. A fan at the portal drew this air out of the mine and forced it through a filtering unit before discharging it into the atmosphere. This process effectively prevented contamination of the walls of the decline with beryllium dust, recirculation of contaminated air, and pollution of the outside environment. We used water sprays in the decline and at the muck piles to further prevent dust. Together these measures established the viability of underground mining from the standpoint of meeting the applicable Federal standards.

The contract for a mine feasibility study of the west end orebody was awarded to American Mine Services (AMS). They were assigned the task of performing an evaluation of the geologic work done to date by Cyprus geologists. They were to select a mining method for the deposit and to do basic mine design work. An evaluation of the mineable reserves was to be made along with an estimate of operating costs and capital costs. AMS utilized the expertise of specialists in ore geology, computerized statistical ore reserve estimates, rock mechanics and mine design, as well as their skills at cost estimating.

The geology work by AMS confirmed the estimates of the reserves made by Cyprus. AMS, in fact, felt the Cyprus figures were conservative even though Cyprus used a higher density for the ore. AMS preferred 13 cubic feet per ton compared to 12 cubic feet per ton used by Cyprus.

Using a 0.5% BeO cutoff, AMS estimated the total geologic reserves of the West End orebody were 2.4 million pounds BeO between the section 25 feet northwest of the fan pattern drilled at section 400 and the section 25 feet southeast of the fan pattern drilled at section 550. The average grade was 2.35% BeO. For the same interval, Cyprus geologists estimated a total of 2.1 million pounds at a grade of 2.91% BeO.

While the ore zone between sections 375 and 575 was now considered well explored, and two million pounds could be classified as "proven and probable", these reserves alone were not sufficient to support the mine for 10 years at either of the production rates specified (300,000 and 1,000,000 pounds per year). Therefore, the reserves available over the length of the orebody from section 0 to section 1200 were calculated. The orebody is open beyond section 1200, but these reserves were not estimated. The additional reserves were classified as possible, and they were estimated based on the surface drilling data.

AMS recognized the importance of selective mining to the success of the project. They chose to use a two step kriging method to evaluate each ore block. One step kriging would only predict the average grade of the entire block. With two step kriging, it was possible to make a prediction of the amount of each block which would be found to be ore and the amount which would be waste. The grade of the part which would be ore was predicted in step two. The cost to mine and process the ore plus the cost to handle the waste (assuming 50% of it could be left in place) was assumed to be the cost to mine each block. The revenue generated by the pounds of BeO recovered from the ore contained in the block was compared to the cost to determine whether or not to mine the block. This allowed the boundary of the mineable orebody to be determined on a more economically realistic basis than the usual method of selecting a cutoff grade for the boundary.

Costs were estimated for two production rates; 300,000 and 1,000,000 pounds per year. Revenue rates were projected for two price scenarios ($15 and $25 per pound BeO). This resulted in four block models with different economic boundaries. Each model yielded a different average ore grade, different total reserves, different waste tonnages contained within the mining area and different unit costs. The effective cutoff grades resulting from the analysis were also different. A 90% mill recovery was assumed.

	Tons Ore	Average Grade	Pounds BeO	Tons Waste Cont	Average Cost/Lb
1,000,000 lb/yr $15 per lb	161,501	1.94	6,281,757	195,493	$1.78
1,000,000 lb/yr $25 per lb	204,643	1.70	6.951,654	330,263	1.89
300,000 lb/yr $15 per lb	136,955	2.10	5,765,417	146,929	2.09
300,000 lb/yr $25 per lb.	179,701	1.84	6,604,023	249,910	2.31

The mining method selected for the West End orebody is mechanized cut and fill. This method is relatively costly. However, it permits the selectivity required to separate ore from waste and minimize costly dilution. Milling costs per ton are much higher than mining costs so maintaining a higher average ore grade is easily justified. This method also provides good ground support. Both overhand and underhand mining would be used depending on production scheduling needs.

Access to the top of the orebody would be gained by the existing decline. The existing laterals would be extended to provide additional drilling stations to delineate additional reserves. Access to the bottom of the orebody would be provided by a second decline to be driven in from the surface (near where the West End structure would surface if it did not pinch out first). The lower decline would provide the haulage route to bring the ore to the surface. It would provide ventilation and the second opening required by law. As with the laterals above, it would be offset from the strike of the orebody to allow development drilling. The location of the these drifts can be seen on Figure No. 7 included in this section, showing shape of the ore body between sections 0 and 1200.

A spiral ramp shown on Figure No. 8 connects the top and bottom of the orebody. As ore is mined on the various levels, it is hauled by truck down the ramp and out the haulage ramp.

Each level is mined in three separate cuts as shown in Figure No. 9 included in this section. The figure depicts the overhand sequence. Underhand is the reverse; where mining proceeds beneath the fill. Each cut is 8 feet high and consists of drifts driven adjacent to one another where there is ore. The width of these drifts is determined by rock conditions also. The first drift on each cut is the one driven next to the microgranite contact. Because the microgranite is so fractured, the width of this drift would be 6 feet or less. A miniature loader of ½ yard capacity and a small single boom jumbo would be used to mine this narrow opening. Shotcrete would provide support. Only about 50 feet would be mined in this fashion before backfilling due to the low efficiency of the tiny loader for long muck hauls.

With cemented backfill supporting the side toward the microgranite, the adjacent drift would be driven 8 feet wide allowing the use of larger equipment: 1.25 yard loaders, 5 ton trucks and 2 boom jumbo. Support will be with shotcrete. When this drift reaches the end of the 50 foot length of the backfilled contact drift, the small equipment would be returned to extend the narrow contact drift. After the first two drifts have been completed and backfilled, additional 8 foot wide drifts could be driven. Many combinations of drifts are possible on each cut. Probe drilling the ribs of the drifts will provide assay samples to plan and guide the adjacent drifts. After all the drifts on a cut have been mined and backfilled, then the drifts on the cut above or below are started. When the three cuts on each level are complete, then mining must proceed to a different level on the ramp or in the opposite direction from the ramp. AMS has devised a clever sequence of mining and backfilling to allow the complete extraction of ore from the ramp area as the mine approaches exhaustion.

To provide ventilation, fresh air enters the mine through the lower decline and reaches the production drifts by way of the spiral ramp. In the production drifts where the beryllium contaminated dust is being created by the mining, 30 inch diameter rigid metal vent ducts will draw the contaminated air from the working place and deliver it to an 8 foot diameter ventilation raise adjacent to the ramp system. A 70 horsepower fan mounted in a drift at the top of the raise will push the air on through a dust collector. The scrubbed air from the dust collector will exit the mine through the existing upper decline.

Backfill material will be produced at a quarry, on site, operated by the mining staff. Crushed limestone from the quarry (containing no hazardous beryllium dust) would be delivered and stockpiled at the portal at the upper decline along with the cement. This arrangement is shown on Figure No. 10 included in this section. In backfilling, these ingredients would be injected into a 6 inch diameter pipe carrying a stream of high pressure air. Using equipment developed by Hanna-Beric, Inc., up to 300 tons per hour of this backfill can be delivered underground. Water is added as the material is blown into the opening and the backfill becomes concrete. Only enough cement is used to provide the minimum strength required.

Other surface facilities planned by AMS included the bins for the storage of various grades of ore, a mine office and lunch room trailer, air compressor, electrical substation and maintenance shop. These would be located at the portal to the lower decline. This arrangement is shown on Figure No. 11 included in this section.

Mining capital requirements totaled $2.9 million for the 1,000,000 pound per year plans and $2.6 million or the 300,000 pound per year plans. The negligible difference reflects the fact that production is expanded by adding crews on second and third shifts rather than by adding more machinery.

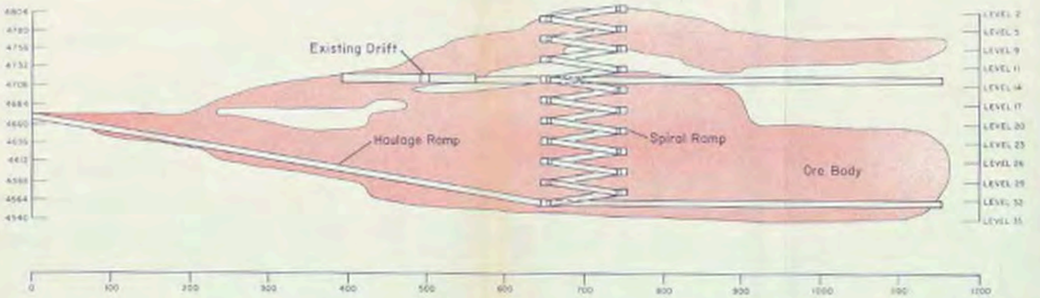
The manpower planned varies from year to year with the ore grade because the pounds produced were held constant. For the 1,000,000 pound per year case the mine operates five days per week and three shifts per day. For the 300,000 pound per year case the mine operates only on one shift per day.

The overall rate of productivity is a conservative 3 tons per man shift. Industry averages for this type of mining would be between 4 and 6 tons per manshift. However, the small size of this mine and the burden of greater selectivity in mining justify the lower rate.

The cost of this type of mining is reflected in cost per ton of ore produced and in the cost per ton of material (ore and waste) mined. These values can be found on the attached Figure No. 12 included in this section. The effect of the remarkably high grade of the ore is to provide very attractive costs per pound BeO despite the high cost per ton of ore mined necessitated by the mining method.

# # # # # #

LONG SECTION



CYPRUS SIERRA BLANCA, INC.

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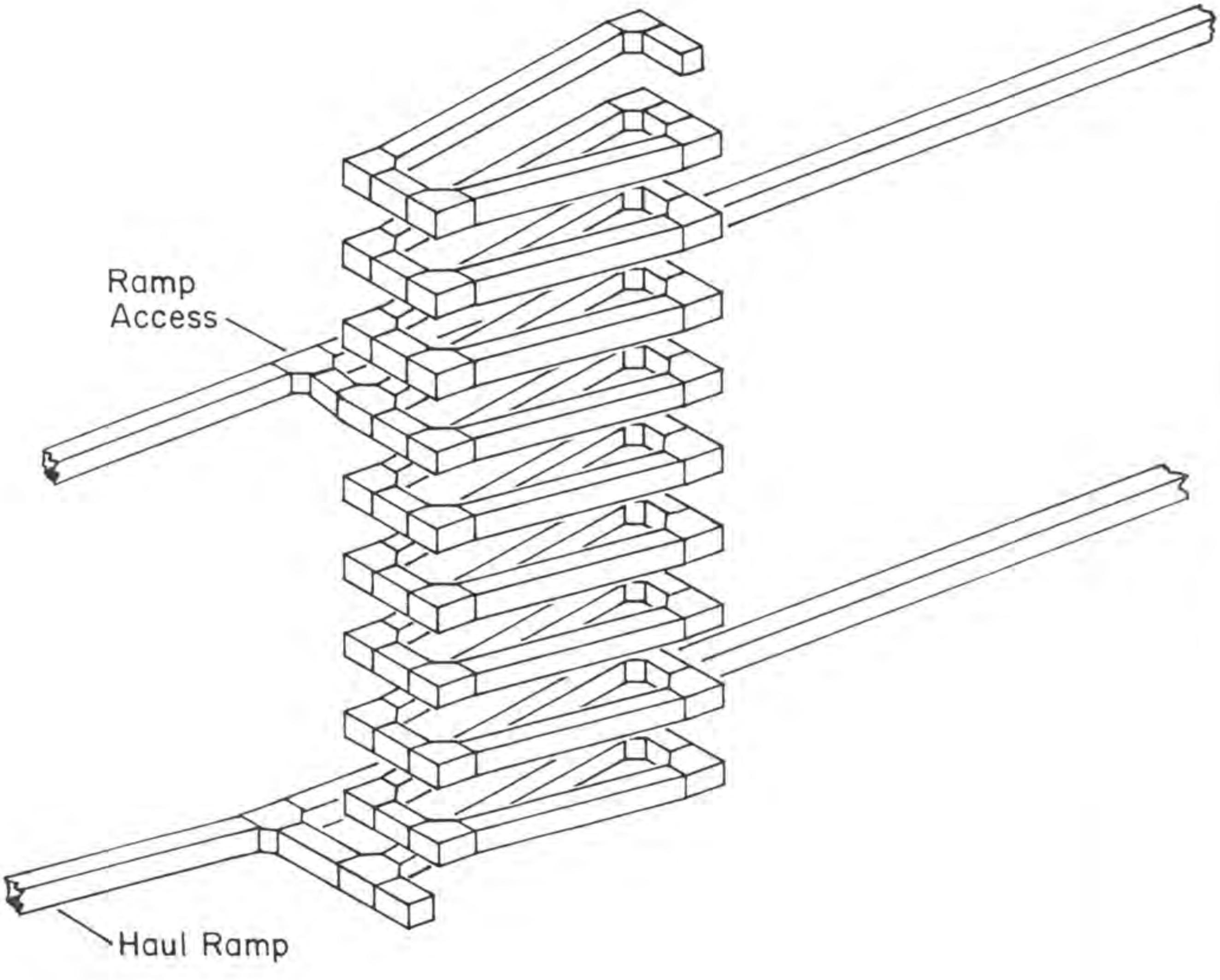
FIGURE

SPIRAL RAMP - SCHEMATIC



CYPRUS SIERRA BLANCA, INC.

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FIGURE 8

Source A.M.S. Figure 8.3

MINING METHOD
Triple Cut & Pneumatic Cement Fill

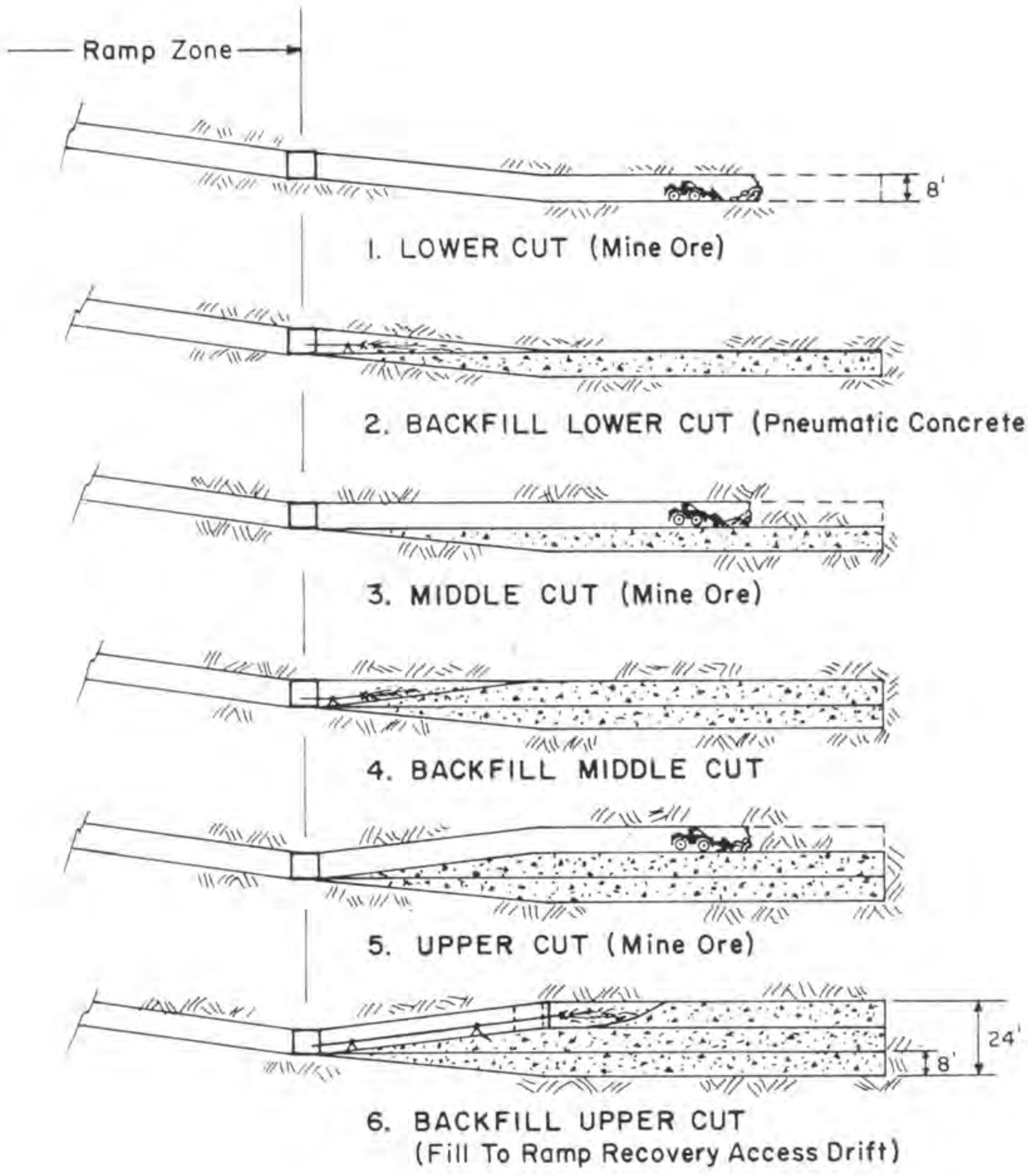

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FIGURE 9

Source: A.M.S. Figure 8.4

UPPER PORTAL MINE YARD

West End Ore Body

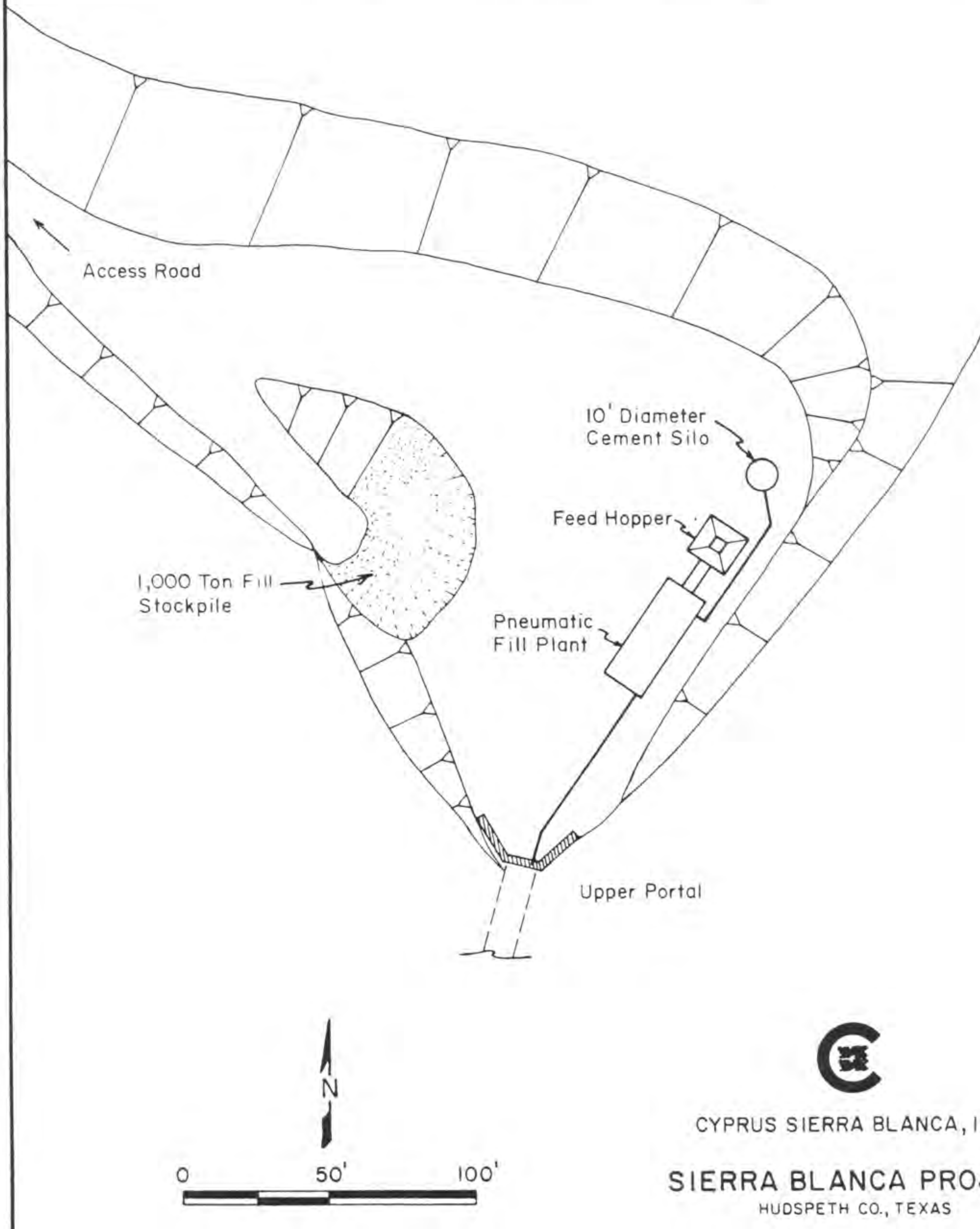

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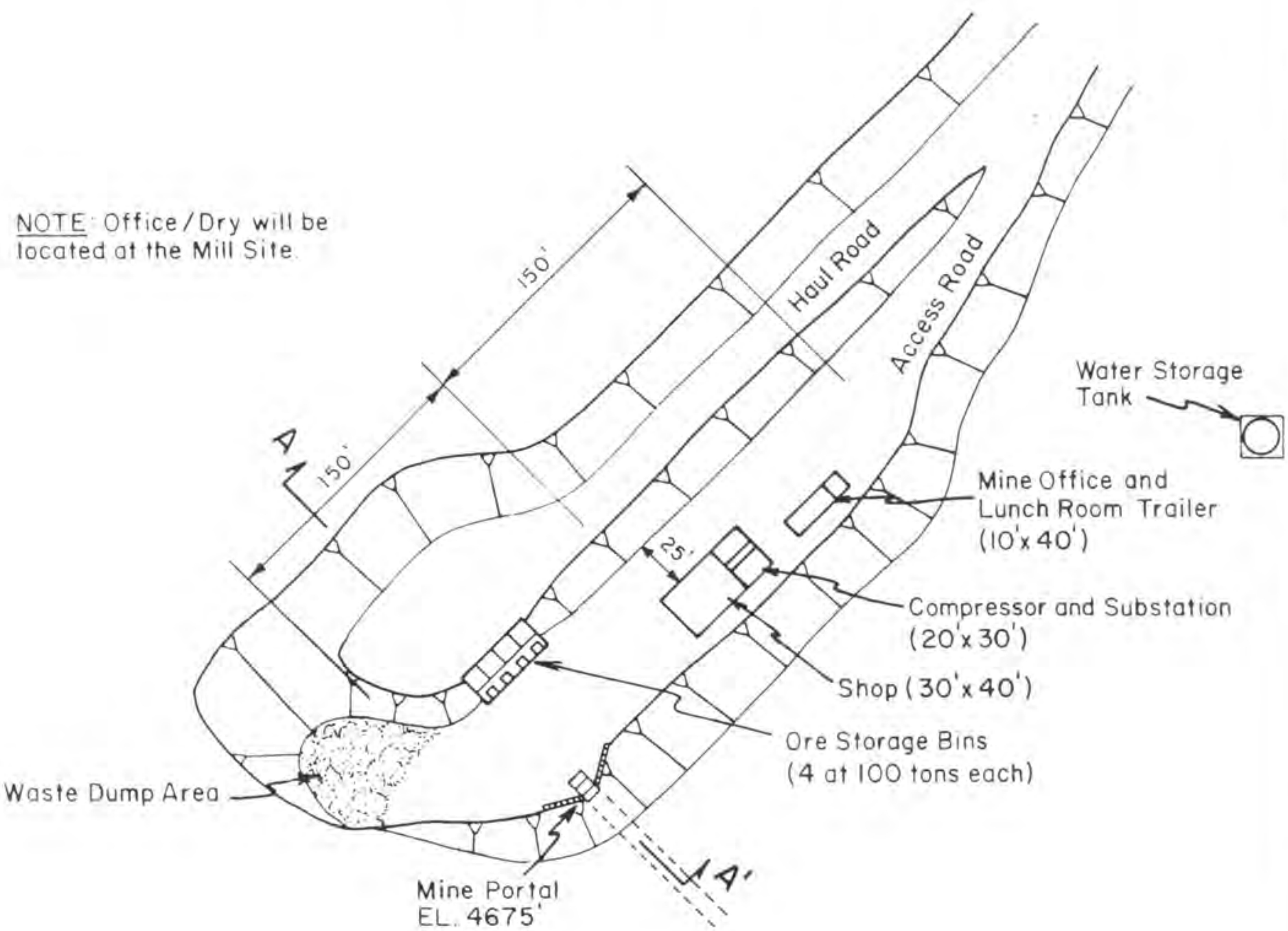
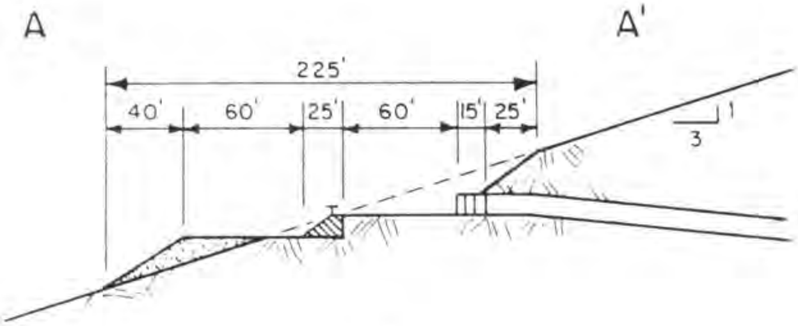
FIGURE 10

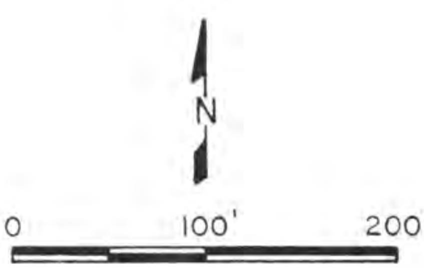
Source: A.M.S. Figure 8.10

LOWER PORTAL MINE YARD

West End Ore Body







Source: A.M.S. Figure 8.11

CYPRUS SIERRA BLANCA, INC.

SIERRA BLANCA PROJECT

HUDSPETH CO., TEXAS

FIGURE 11

WEST END OREBODY
EXECUTIVE OPERATING SUMMARY

	CASE 1 1,000,000# @ $15/#	CASE 2 1,000,000# @ $25/#	CASE 3 300,000# @ $15/#	CASE 4 300,000# @ $25/#
Mineable Ore Reserves - Tons	161,509	204,643	136,955	179,701
Percent BeO per Ton	1.94	1.70	2.10	1.84
Total Pounds BeO Available	6,281,757	6,951,654	5,765,417	6,604,023
Years of Production	7.3	7.7	20	20
Years Included in Study	7.3	7.7	10	10
Total Tons Mined	161,509	204,635	80,232	91,569
Percent BeO/Ton Mined	1.94	1.70	2.15	1.88
Pounds BeO Mined	6,281,756	6,951,655	3,444,353	3,444,353
Tons Waste Mined	96,179	165,088	21,183	55,265
Average Production- Ore & Waste TPD	139.9	192	40.56	53
Mine Operating Expense				
Electric Power	$ 704,667	$ 766,233	$ 1,224,654	$ 1,280,033
Indirect	3,772,391	3,821,039	3,193,755	3,213,060
Development	286,109	286,109	125,532	125,532
Operations	6,432,555	8,263,810	2,644,510	3,346,588
TOTAL	$11,195,722	$13,137,199	$ 7,188,452	$ 7,965,213
$/Ton Ore	69.32	64.20	89.60	86.99
$/Pound BeO Mined	1.78	1.89	2.09	2.31
$/Ton Material Mined	43.45	35.53	70.88	54.25

Figure 12

MILL FEASIBILITY STUDY

A mill feasibility study was prepared by Stearns-Roger based upon the process established by the Cabot Corporation which utilized the process developed earlier by the U.S. Bureau of Mines and that generally employed by Brush Wellman at their processing facility at Delta, Utah. Stearns-Roger provided engineering and construction services for this beryllium hydroxide plant and were therefore well qualified to conduct the feasibility study.

The main products of the feasibility study were capital and operating cost estimates for two facilities to produce beryllium hydroxide at different rates. Capital and operating cost summaries for production rates of 1,000,000 lb./yr. BeO and 300,000 lb./yr. BeO are included in this section of the report as Figures 14, 15 and 16. A general arrangement plot plan of the 1,000,000 lb./yr. BeO plant, and sketches of the tailings and heap leach areas are included as Figures 17, 18 and 19 in this section of the report.

Additional work products of the study included reviews of alternate unit operation methods to best effect the required process operations. The process alternates studied included the following:

- Jaw crushing and ball milling in comparison to a SAG milling circuit.
- CCD thickeners vs. belt filters for liquid/solid separation.
- Conventional agitated leaching vs. heap leaching.
- Direct precipitation of pregnant leach solution vs. solvent extraction.

The feasibility study also included the development of siting values for three alternative mill site locations. Estimated costs of access roads, the extension of electrical power services, the mill site location in relation to the mine operations, and the problems regarding acquisition of surface rights were evaluated. The three proposed mill sites, A, B and C are identified on a Civil Location Plan, Figure 20 which is included in this section of the report. Site A is the preferred site for the mill facilities.

Additional laboratory testwork and subsequent process reviews provided the basis for certain capital cost reductions to be taken from the Stearns-Roger estimates. Reviews of Cyprus surplus equipment at our various operations also established the basis for further capital cost reductions.

Cost adjustments are shown in detail in the Capital Cost Development Report prepared by the Cyprus Project Staff. The summary of these estimated capital costs is as follows:

1,000,000 Lbs./Year BeO Plant

	Mill Facilities (SR. Study)		Capital Cost
1.	Capital Expense		10,706,000
2.	Scope Changes in Process	(-)	774,600
3.	Equipment Changes (Filters)	(-)	744,000
4.	Surplus/Used Equipment Credit	(-)	501,000
	TOTAL		$ 8,686,400

300,000 Lbs./Year BeO Plant

	Mill Facilities (Sr. Study)		Capital Cost
5.	Capital Expense		7,649,000
6.	Scope Changes in Process	(-)	350,000
7.	Equipment Changes (Filters)	(-)	350,000
8.	Surplus/Used Equipment Credit	(-)	501,000
	TOTAL		$ 6,448,000

An engineering, procurement and construction schedule was prepared for the mill facilities which show a total of 16 months required for project completion. This schedule is predicated upon detail engineering being essentially 60% completed before soliciting firm price construction bids. Figure 21 (Engineering-Procurement-Construction Schedule) from the Stearns-Roger study reflects the program.

Further laboratory test work is required to determine optimum design criteria for the detail design phase of the project. The optimum relationship of the rates for leaching, filtration and solvent extraction must be established, based on an integrated test program, steady state, with full recycles. SAG milling tests and the determination of the required heat input values for autoclaving would be included in this laboratory test program.

Heap leaching evolved as a process alternative late in the development program, as a possible method for treating below cutoff grade ore. Two simple column leach tests were conducted which proved the viability of a heap leach technique. Further test programs have been scheduled to further evaluate this process alternative.

# # # # # #

CYPRUS METALS COMPANY
SIERRA BLANCA BERYLLIUM PROJECT
FEASIBILITY STUDY

CAPITAL COST ESTIMATE SUMMARY

1,000,000 lb. BeO/yr Plant

ACT	DESCRIPTION	HOURS	LABOR	MATERIAL	OTHER	TOTAL
A	EARTHWORK	1,930	17,400	200	164,500	182,100
B	CONCRETE	10,930	100,000	205,000		305,000
C	BUILDINGS/STRUCTURES	3,040	31,300	175,100	195,400	401,800
D	PROCESS EQUIPMENT	10,790	115,000	4,100,000		4,215,000
E	PIPING	24,690	261,200	609,500		870,700
F	ELECTRICAL	7,470	74,900	327,600		402,500
G	PAINTING	1,200	11,000	4,800		15,800
L	PLANT FACILITIES			10,300	12,400	22,700
N	INSTRUMENTS/CONTROLS	1,210	12,300	233,700		246,000
P	INSULATION				52,500	52,500
T	DEMOLITION					0
U	SPARE PARTS					0
***	DIRECT FIELD COST AVG DFL RATE $10.17 DFL/DFC 9.28%	61,260	623,100	5,666,200	424,800	6,714,100
H	FIELD STAFF		234,500	19,500	80,500	334,500
H8	PAYROLL TAXES & INSUR				244,600	244,600
K	CONSTRUCTION SUPPLS			46,500		46,500
M	PRE-OPERATIONAL CKOUT	500	7,000			7,000
S	TEMPORARY FACILITIES	5,310	53,800	45,300	22,800	121,900
V	CRAFT BENEFITS				85,400	85,400
						0
W	CONSTRUCTION EQUIP	1,264	15,000	101,900	238,100	355,000
	INDIRECT FIELD COST	7,074	310,300	213,200	671,400	1,194,900
	TOTAL FIELD COST	68,334	933,400	5,879,400	1,096,200	7,909,000
J	HOME OFFICE & FEES					1,228,400
	TOTAL FIELD AND HOME OFFICE					9,137,400
O	TAXES					370,600
R	PREMIUM PAY					8,100
Y3	CONTINGENCY (12.5 %)					1,189,500
	SUBTOTAL					10,705,600
Y	FEES - INCLUDED WITH J HOME OFFICE					
	T O T A L (ROUNDED TO NEAREST $1,000)					10,706,000

CYPRUS METALS COMPANY
SIERRA BLANCA BERYLLIUM PROJECT
FEASIBILITY STUDY

CAPITAL COST ESTIMATE SUMMARY

300,000 lb. BeO/yr Plant

ACT	DESCRIPTION	HOURS	LABOR	MATERIAL	OTHER	TOTAL
A	EARTHWORK	1,540	13,800	300	163,600	177,700
B	CONCRETE	8,030	73,500	150,100		223,600
C	BUILDINGS/STRUCTURES	1,920	19,800	108,400	195,400	323,600
D	PROCESS EQUIPMENT	8,720	92,900	2,760,000		2,852,900
E	PIPING	17,160	181,500	423,600		605,100
F	ELECTRICAL	5,460	54,700	240,700		295,400
G	PAINTING	880	8,000	3,500		11,500
L	PLANT FACILITIES			10,300	12,400	22,700
N	INSTRUMENTS/CONTROLS	820	8,300	157,300		165,600
P	INSULATION				52,500	52,500
T	DEMOLITION					0
U	SPARE PARTS					0
***	DIRECT FIELD COST AVG DFL RATE $10.16 DFL/DFC 9.57%	44,530	452,500	3,854,200	423,900	4,730,600
H	FIELD STAFF		164,800	14,700	58,900	238,400
H8	PAYROLL TAXES & INSUR				176,800	176,800
K	CONSTRUCTION SUPPLS			33,800		33,800
M	PRE-OPERATIONAL CKOUT	500	7,000			7,000
S	TEMPORARY FACILITIES	3,850	38,900	33,000	16,500	88,400
V	CRAFT BENEFITS				62,300	62,300
						0
W	CONSTRUCTION EQUIP	1,200	14,300	89,500	222,200	326,000
	INDIRECT FIELD COST	5,550	225,000	171,000	536,700	932,700
	TOTAL FIELD COST	50,080	677,500	4,025,200	960,600	5,663,300
J	HOME OFFICE & FEES					870,400
	TOTAL FIELD AND HOME OFFICE					6,533,700
Q	TAXES					259,300
R	PREMIUM PAY					5,900
Y3	CONTINGENCY (12.5 %)					849,900
	SUBTOTAL					7,648,800
Y	FEES - INCLUDED WITH J HOME OFFICE					
	T O T A L (ROUNDED TO NEAREST $1,000)					7,649,000

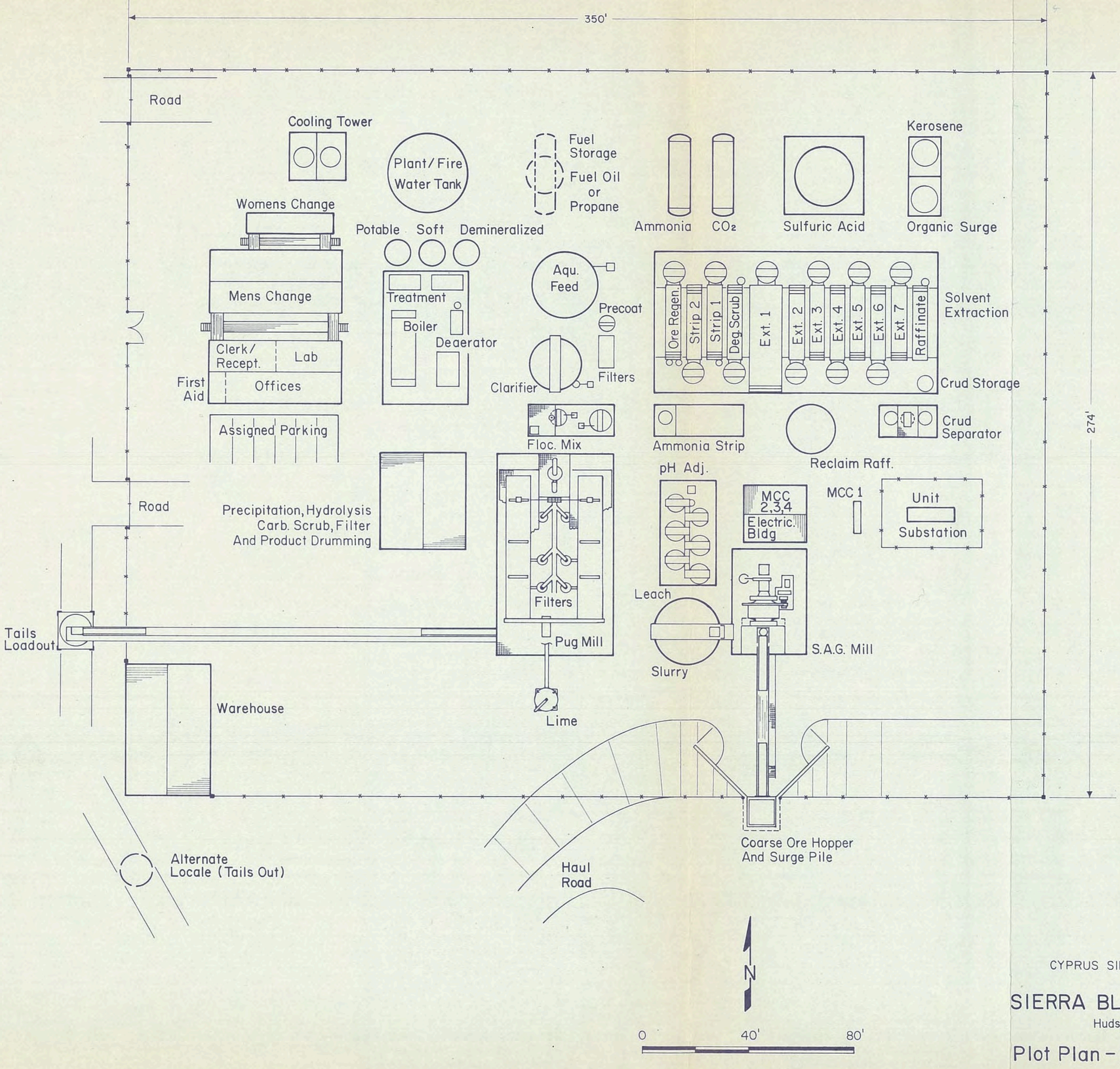
Figure 15

CYPRUS METALS COMPANY
SIERRA BLANCA BERYLLIUM PROJECT
FEASIBILITY STUDY

OPERATING COST SUMMARY

	Production Capacity	
	1,000,000 lb/yr	300,000 lb/yr
Labor	$1,282,000	$1,026,000
Reagents	1,347,210	404,160
Utilities	2,148,970	797,050
Maintenance Supplies	205,000	138,000
Operating Supplies & Services	167,000	133,000
	$5,150,180	$2,498,210
	$ 139.21/ton	$ 225.04/ton
	$ 5.15/lb BeO	$ 8.33/lb BeO

Figure 16



Source: S.R. Dwg. 8733001-1-11

CYPRUS SIERRA BLANCA, INC.

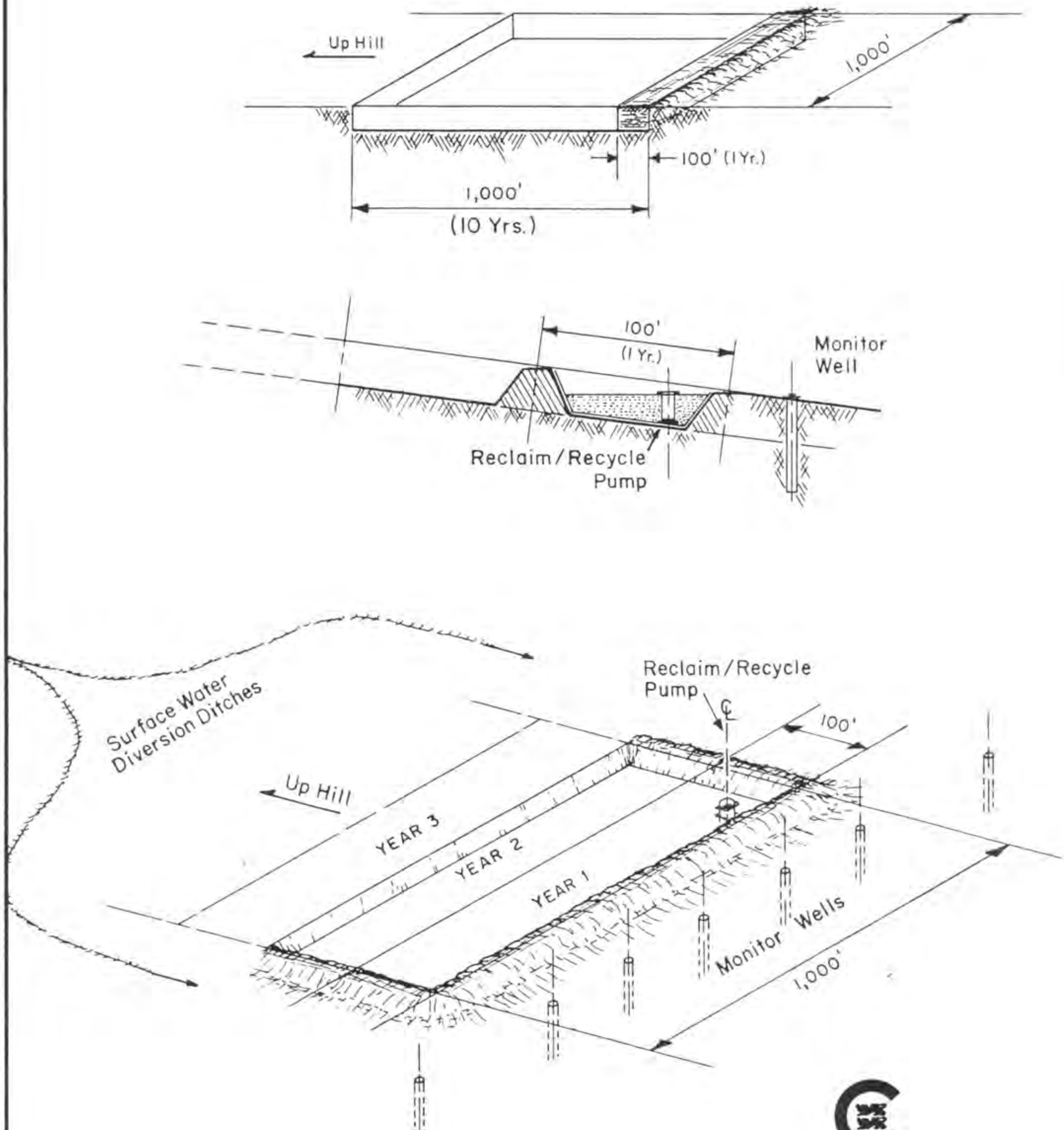
SIERRA BLANCA PROJECT

Hudspeth Co., Texas

Plot Plan – 1 MM lb./yr. Plant

Figure 17

TAILINGS DISPOSAL SYSTEM



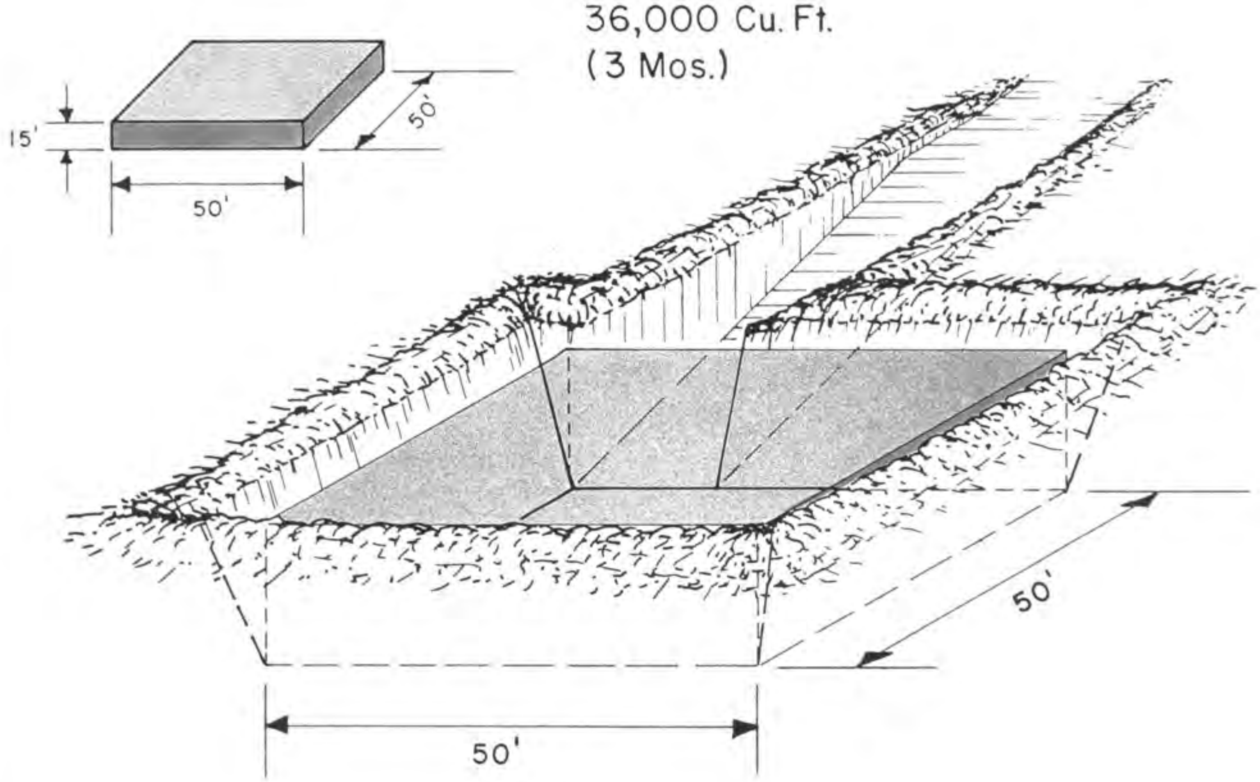
CYPRUS SIERRA BLANCA, INC.

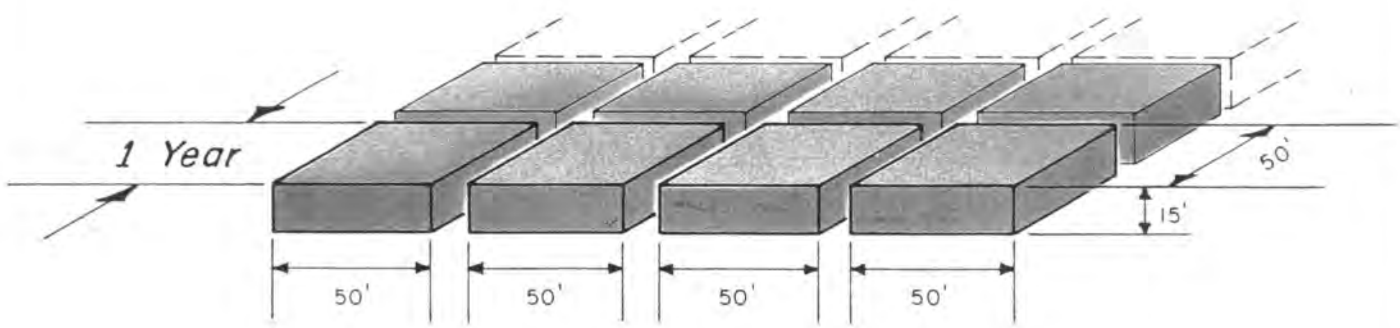
SIERRA BLANCA PROJECT

HUDSPETH CO., TEXAS

FIGURE 18

HEAP LEACH SYSTEM



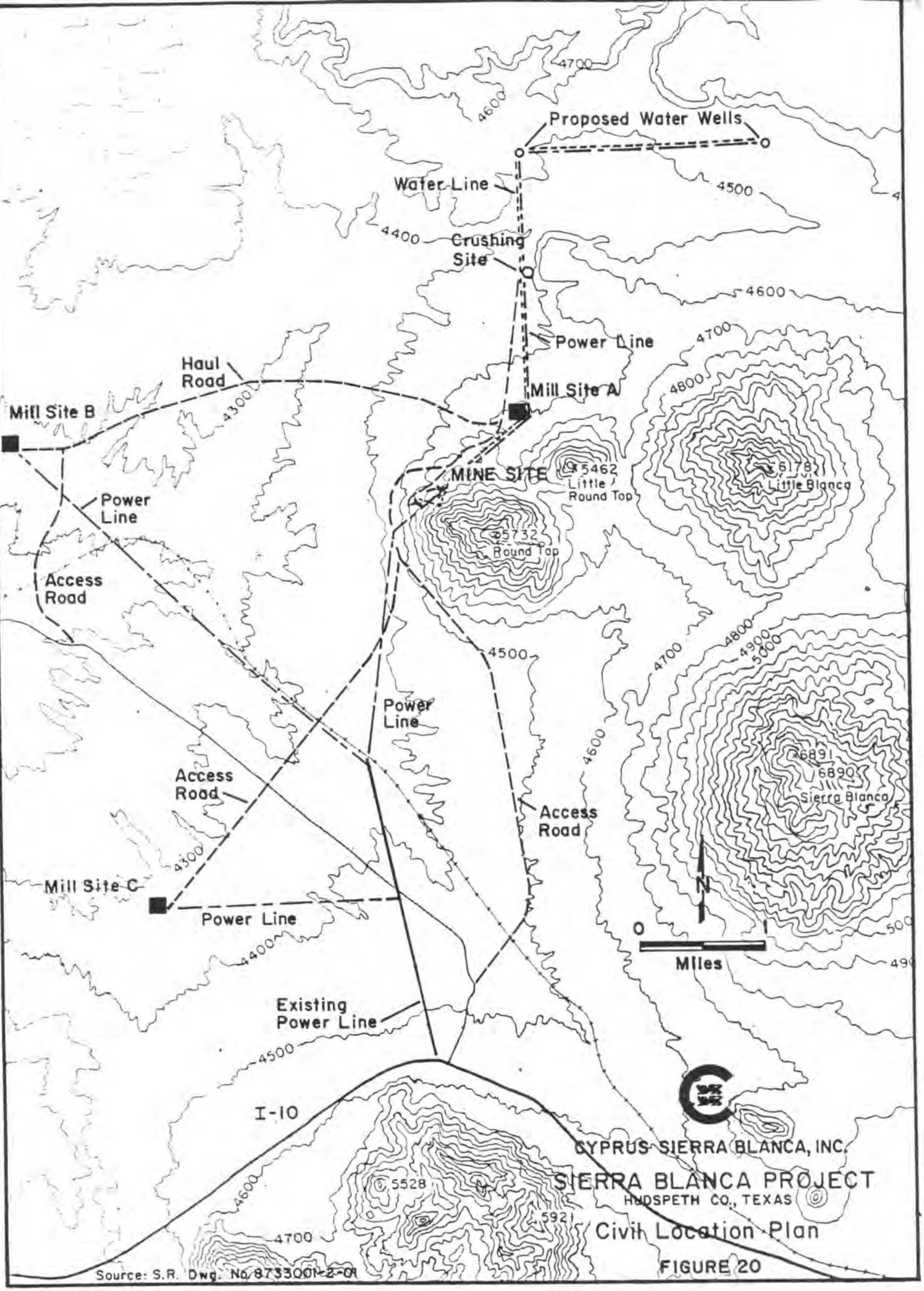


200' Wide
100' Uphill - (2 Yrs.)

CYPRUS SIERRA BLANCA, INC.

SIERRA BLANCA PROJECT
HUDSPETH CO., TEXAS

FIGURE 19



CYPRUS SIERRA BLANCA, INC.

SIERRA BLANCA PROJECT

HUDSPETH CO., TEXAS

Civil Location Plan

FIGURE 20

Source: S.R. Dwg. No 873300I-2-01

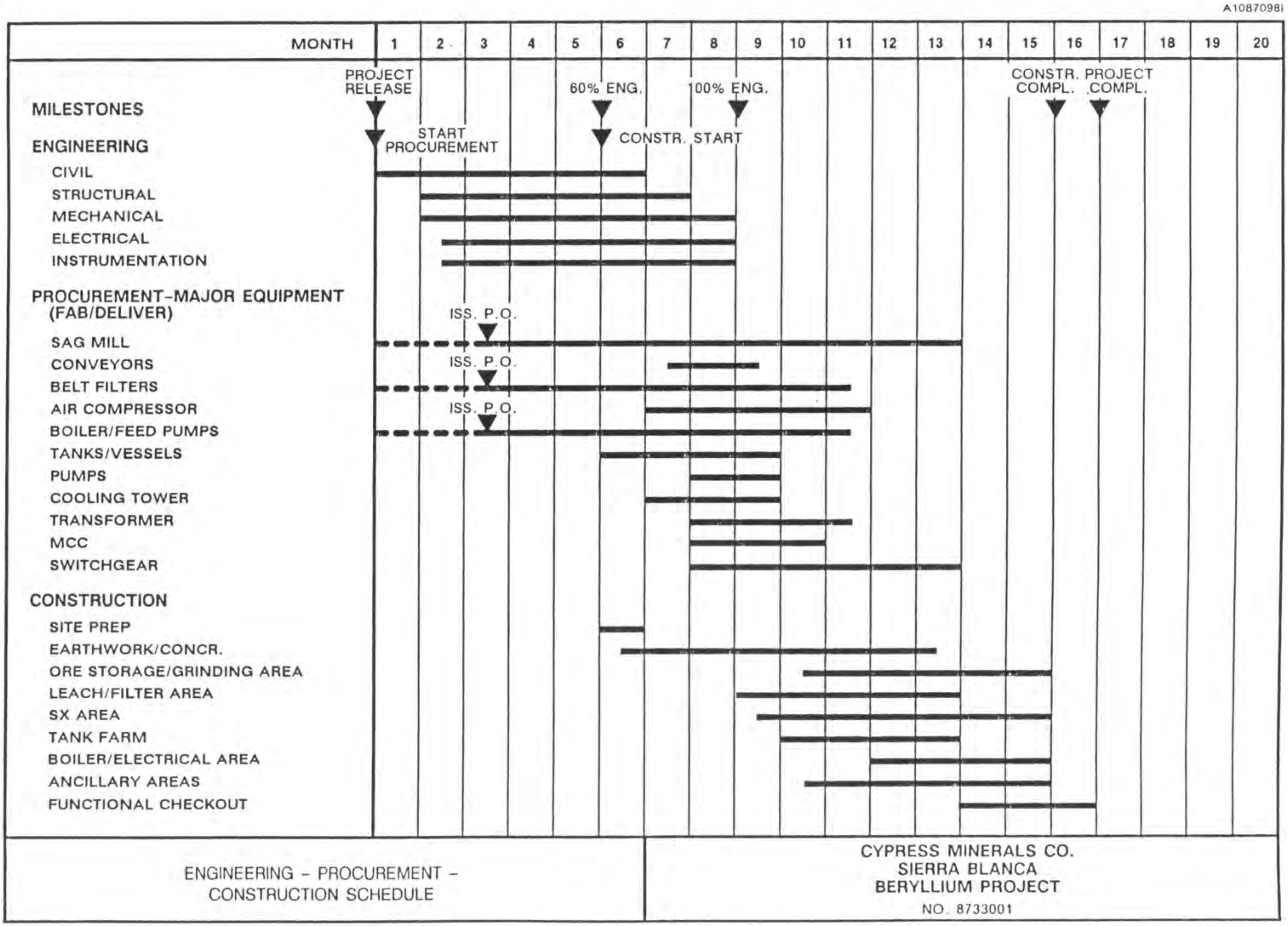

A1087098I
MONTH
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
PROJECT RELEASE
START PROCUREMENT
60% ENG.
CONSTR. START
100% ENG.
CONSTR. COMPL.
PROJECT COMPL.
MILESTONES
ENGINEERING
CIVIL
STRUCTURAL
MECHANICAL
ELECTRICAL
INSTRUMENTATION
PROCUREMENT-MAJOR EQUIPMENT (FAB/DELIVER)
ISS. P.O.
SAG MILL
CONVEYORS
BELT FILTERS
AIR COMPRESSOR
BOILER/FEED PUMPS
TANKS/VESSELS
PUMPS
COOLING TOWER
TRANSFORMER
MCC
SWITCHGEAR
CONSTRUCTION
SITE PREP
EARTHWORK/CONCR.
ORE STORAGE/GRINDING AREA
LEACH/FILTER AREA
SX AREA
TANK FARM
BOILER/ELECTRICAL AREA
ANCILLARY AREAS
FUNCTIONAL CHECKOUT
ENGINEERING - PROCUREMENT - CONSTRUCTION SCHEDULE
CYPRESS MINERALS CO.
SIERRA BLANCA
BERYLLIUM PROJECT
NO. 8733001

Figure 21

CAPITAL COST

The capital costs for the project were developed by Stearns-Roger for the mill facilities and by American Mine Services for the mine facilities. In addition, the estimated costs for the tailings disposal system, infracture items, and property and mineral acquisitions were developed by the Cyprus staff. Production royalty costs have been established yet designated as an operating cost value.

Possible scope changes in the process were identified after the completion of the mill feasibility study. These changes were evaluated in conjunction with further laboratory test work. The conclusions indicate reductions in the mill capital cost requirements are in order. Changes are listed accordingly. Another cost reduction was also taken for the number and sizing of the tailings filtration equipment.

Surveys of surplus equipment at various operations were conducted. Reviews of our equipment requirements were also held with used equipment companies. Based on the reviews of available items, capital cost reductions have been listed for both the mine and mill requirements.

The following are capital cost summaries for a 1,000,000 Lbs./Year BeO operation and a 300,000 Lbs./Year operation. See Capital Cost Development Report for the details of variations due to scope changes, equipment changes, surplus/used equipment credits, and supplementary project costs.

1,000,000 Lbs./Year BeO Plant
Mine-Mill-Infrastructure-Property/Mineral Acquisitions

	Capital Cost	Deferred/Operating	Total Capital
1. Mine Facilities			
a. Capital Expense (AMS Study)	2,859,000		
b. Pre-production Development	1,727,700		
c. Definition Drilling		437,700	
d. Replacement and Inventory		150,000	
e. Surplus/Used Equipment Credit	(-) 532,100		
SUBTOTAL	$ 4,054,600		$ 4,054,600
2. Mill Facilities			
a. Capital Expense (SR Study)	10,706,000		
b. Scope Changes in Process	(-) 774,600		
c. Equipment Changes (Filters)	(-) 744,000		
d. Surplus/Used Equipment Credit	(-) 501,000		
SUBTOTAL	$ 8,868,400		$ 8,686,400
3. Tailings System - 2 Years Initial Operating Costs Thereafter)	1,075,000	515,000	
SUBTOTAL	$ 1,075,000		$ 1,075,000
4. Infrastructure			
a. Well Water System	720,000		
b. Roads - Access to Site A	108,400		
- Mine to Millsite	12,700		
- Mine to Quarry	100,000		
c. Mine, Millsite Preparation	280,000		
d. Mine, Quarry, Security Fencing	40,000		
e. Electrical Power System	200,000		
SUBTOTAL	$1,461,000		$ 1,461,100

	Capital Cost	Deferred/Operating	Total Capital
5. Property and Mineral Acquisitions			
a. Conversion of Leases, Exploration to Mining			
For Sections 40, 41, 45, 3.10,15,22.			
7 X $9,600 each = $67,200	67,200		
b. Surface Ownership of State Land			
For Sections 43.5,6,7,8,17,18,19,20 29,30,32			
12 X $25,600 each = $307,200	307,200		
c. Surface Ownership of A-1 Land (2½ Sections)			
For Sections 1 (West ½), 12, 13			
Latest Offer at $80 per Acre			
= $80 X 640 X 2.5 = $128,000	128,000		
d. Alternatives/Benefits for Further Negotiations Re: 2½ Sections (Item C above)			
• Cost of 2 New Wells, Excluding Pumps, O'Land Pipe--Savings of $200,000			
• Cost of Lawsuit to Win Ownership and/or Benefit of No Nuisance = $100,000			
• Should 2nd Portal be Required to Relocate to North--Added Cost for Added Drifting = $500,000			
e. Surface Rights for Section 1 (East ½), Long Term Available at $1,000 per year, Treats as Annual Operating Charge		$1,000/Yr.	
			502,400
			$15,779,500

300,000 Lbs./Year BeO Plant

Mine-Mill-Infrastructure-Property/Mineral Acquisitions

	Capital Cost	Deferred/Operating	Total Capital
1. Mine Facilities			
a. Capital Expense (AMS Study)	2,610,070		
b. Pre-production Development	1,727,700		
c. Definition Drilling		217,400	
d. Replacement and Inventory		150,000	
e. Surplus/Used Equipment Credit	(-) 532,100		
SUBTOTAL	$3,805,670		$ 3,805,670
2. Mill Facilities			
a. Capital Expense (SR Study)	7,649,000		
b. Scope Changes in Process	(-) 350,000		
c. Equipment Changes (Filters)	(-) 350,000		
d. Surplus/Used Equipment Credit	(-) 501,000		
SUBTOTAL	$6,448,000		$ 6,448,000
3. Tailings System - 2 Years Initial Operating Costs Thereafter)	350,000	200,000	
SUBTOTAL	$ 350,000		$ 350,000
4. Infrastructure			
a. Well Water System	720,000		
b. Roads - Access to Site A	108,400		
- Mine to Millsite	12,700		
- Mine to Quarry	100,000		
c. Mine, Millsite Preparation	280,000		
d. Mine, Quarry, Security Fencing	40,000		
e. Electrical Power System	200,000		
SUBTOTAL	$1,461,000		$ 1,461,100

300,000 Lbs./Year BeO Plant

Mine-Mill-Infrastructure-Property/Mineral Acquisitions

(Continued)

	Capital Cost	Deferred/Operating	Total Capital
5. Property and Mineral Acquisitions			
a. Conversion of Leases, Exploration to Mining			
For Sections 40, 41, 45, 3.10,15,22.			
7 X \$9,600 each = \$67,200	67,200		
b. Surface Ownership of State Land			
For Sections 43.5,6,7,8,17,18,19,20 29,30,32			
12 X \$25,600 each = \$307,200	307,200		
c. Surface Ownership of A-1 Land (2½ Sections)			
For Sections 1 (West ½), 12, 13			
Latest Offer at \$80 per Acre			
= \$80 X 640 X 2.5 = \$128,000	128,000		
d. Alternatives/Benefits for Further Negotiations Re: 2½ Sections (Item C above)			
• Cost of 2 New Wells, Excluding Pumps, O'Land Pipe--Savings of \$200,000			
• Cost of Lawsuit to Win Ownership and/or Benefit of No Nuisance = \$100,000			
• Should 2nd Portal be Required to Relocate to North--Added Cost for Added Drifting = \$500,000			
e. Surface Rights for Section 1 (East ½), Long Term Available at \$1,000 per year, Treats as Annual Operating Charge		\$1,000/Yr.	
			502,400
			\$12,567,170

OPERATING COST

Introduction

The Sierra Blanca operating cost estimate has been prepared by several groups and individuals. Mine operating costs were estimated by American Mine Services (AMS) in the January 18, 1988, "Mine Feasibility Study". Several scenarios are presented in the AMS report in Section 10. Mill operating costs were prepared by Stearns-Roger (S-R) in the November, 1987 "Preliminary Feasibility Study". These costs provided the basis for the values listed in the Summary of Operating Costs, Figure No. 22 included in this report are presented in the "Operating Cost Estimate" section. The General and Administrative Cost estimate has been estimated by Cyprus.

The mill feasibility study was completed before the mine study was initiated. An average mill feed grade was conservatively estimated from the average in situ grade. Known low rock stability dictated using a high estimate of dilution thus a 1.5% BeO mill feed grade was used for Life of Mine. The Life of Mine estimates were later estimated by AMS to be 1.94% and 2.15% BeO for the 1,000,000 and 300,000 pound per year production rates.

The mill cost estimate was based on processing 36,960 and 11,220 tons of ore per year averaging 1.5% BeO to produce 1,000,000 and 300,000 pounds BeO per year respectively. The Life of Mine estimate for the same product rates average 28,860 and 7,750 tons of ore per year. Therefore, the mine and mill costs require normalization. This was accomplished by converting the mill cost estimate to the same basis as the mine costs.

See Operating Cost Development Report for the details of the normalization calculations.

OPERATING COST SUMMARY

Item	1,000,000 Pound Per Year		300,000 Pound Per Year	
Mine	$1,980,288		$660,965	
$ Per Ton		69.78		85.29
$ Per Lb. BeO		1.98		2.20
Mill	3,254,114		$1,415,924	
$ Per Ton		124.18		182.70
$ Per Lb. BeO		3.52		4.72
G&A	1,207,777		801,556	
$ Per Ton		42.56		103.43
$ Per Lb. BeO		1.21		2.67
Total	$6,712.179		$2,878,445	
$ Per Ton		236.51		371.41
$ Per Lb. BeO		6.71		9.59

Normalization of Mill Costs

The mill equipment selection was based on a 1.5% mill feed grade and on an ore feed rate which is approximately 30 and 45 percent greater than the mine tonnage estimate for the 1,000,000 and 300,000 pound per year production rates. Therefore, either the mill equipment or mill operating schedule must be downsized to match the mine production schedule. The normalization used in this section reduces the mill operating schedule from 21 shifts per week to 15 shifts per week. All other mill costs are also adjusted as appropriate to reflect the mill feed tonnage and grade as estimated in the AMS report.

The entire question of mill capacity, operating schedule, etc. must be readdressed prior to detailed engineering once a production rate has been established from the marketing efforts.

Mill Labor

The mill labor requirement as estimated by S-R is presented in the S-R report on pages 7-4 and 7-5. The salary and fringe rates were supplied by Cyprus and the organization was reviewed and approved by Cyprus. Some of the labor is for General and Administrative and has been reassigned under that heading for the following normalized case. Also, the reduction to a 5 day week has allowed for some labor reductions, see Figure No. 23 included in this report.

Mine Labor

The mine labor requirements, developed in detail by AMS, show listings under the general categories of General & Administrative, Indirect, Development and Production. These values vary during the life of the mine based on producing a constant product tonnage (1,000,000 lb./yr. BeO or 300,000 lb./yr. BeO) while confronted with variable ore grades. The financial analysis work has addressed these cost variations. For purposes of the cost summaries, values were calculated from AMS data on the following basis:

* Full operating year basis
* At average ore grade over the mine life
* At average yearly requirements of labor, equipment, and material

Total operating staff requirements, prepared as averaged per the labor notation have been shown on Organization Charts, see Figure No. 25 and No. 26, included in this section.

Mill Utilities:

The utilities cost are estimated and presented in the S-R report on page 7-6. Utilities include electric power, propane and process water. Adjustments were required in the power cost estimate to reflect a lower unit rate of $.06/Kwh instead of $.07 as in the S-R estimate, and a reduced power consumption to reflect the mine tonnage rate of 28,380 and 7,750 tons per year instead of 36,960 and 11,220 for the 1,000,000 and 300,000 pound per year cases. Thus, the annual power costs for the 1,000,000 and 300,000 pound per year cases are $404,361 and $110,423 respectively.

Propane costs were reduced form the S-R estimate to reflect a lower consumptive rate and the reduced feed tonnage. A detailed thermodynamic calculation followed by laboratory thermodynamic measurements indicate that the S-R propane consumption is too high. The estimate of propane requirements is reduced from $1,596,700 and $479,000 per year to $966,700 and $290,000 for the 1,000,000 and 300,000 pound per year cases. Since these reflect the higher S-R mill feed rates, these propane costs are further reduced to reflect the mining rates of 28,380 and 7,750 tons of ore per year instead of 36,960 and 11,220. Thus, the annual propane costs for the 1,000,000 and 300,000 pound per year cases are $742,288 and $202,663 respectively.

Water requirements have been reduced to reflect the reduced mill feed tonnage and become $19,703 and $5,379 per annum for the 1,000,000 and 300,000 pound per year cases.

The total utility cost is summarized below.

ANNUAL UTILITY COSTS

	1,000,000 Case	300,000 Case
Power	$ 404,361	$110,423
Propane	742,288	202,663
Water	19,703	5,379
Subtotal	$1,166,352	$318,465

Mill Reagents:

The mill reagent costs are also presented in the S-R report on page 7-6. These costs were adjusted for some reagents to reflect the reduced mill feed tonnage (acid, flocculent and lime). Other reagents are affected by the quantity of Beryllium in the ore and these costs were unchanged since the S-R estimate was based on 1,000,000 and 300,000 pounds per year. These changes are reflected in the following table.

ANNUAL REAGENT COSTS

	1,000,000 Case	300,000 Case
Sulfuric Acid	$ 833,663	$227,656
Carbon Dioxide	72,260	21,680
Ammonia	120,120	36,040
DEHPA	29,270	8,780
Kerosene	7,980	2,390
Flocculent	11,707	3,197
Lime	12,771	3,488
Subtotal	$1,087,771	$303,231

Operating and Maintenance Supplies:

The operating and maintenance supplies as reported in the S-R report on page 7-6 were adjusted to reflect the reduced mill feed tonnage. These costs were reduced to $285,556 and $78,043 for the 1,000,000 and 300,000 pound per year production cases.

Tailings Disposal:

The cost of tailings disposal was outside the scope of the S-R work and was estimated by Cyprus. The costs were estimated for a case in which the filtered tailings would be trucked to an excavated and lined trench and buried on a daily basis. These costs were estimated to be about $5.00 per ton of mill feed. The current plan is to repulp the filtered tailings and pump to an excavated trench. No changes were made in the operating costs and it is believed that considerable conservatism is "built in". Tailings costs are estimated to be $141,900 and $38,750 per year in each case.

Miscellaneous Mill Costs:

Since it is not possible to itemize and estimate all the mill costs, a miscellaneous category is used as an operating cost contingency. This is estimated to be $95,924 and $26,195 for the 1,000,000 and 300,000 pound per year cases.

Total Mill Operating Costs:

The total of the annual mill operating costs are summarized below:

ANNUAL MILL OPERATING COSTS

Item	1,000,000 Case		300,000 Case	
Labor	$ 746,380		$ 651,240	
Utilities	1,166,352		318,465	
Reagents	1,087,771		303,231	
Oper. & Maint. Supply	285,556		78,043	
Tailings	141,900		38,750	
Misc.	95,924		26,195	
Subtotal	$3,524,114		$1,415,924	
$ Per Ton		124.18		182.70
$ Per lb. BeO		3.52		4.72

Mine Operating Costs:

The mine operating costs estimated by AMS are presented in the AMS reports in Tables 10.1 and 10.3. These costs are based on a detailed mine plan which varies slightly each year depending upon the ore grade available. The Life of Mine average operating costs have been extracted to simplify the cost analyses and to be used in conjunction with the annual mill costs already presented.

Life of Mine operating costs for the 1,000,000 and 300,000 pound per year cases are indicated below:

ANNUAL MINE OPERATING COSTS

LIFE OF MINE

Item	1,000,000 Pound Per Year	300,000 Pound Per Year
Labor	$1,013,923	$354,950
Royalties	124,640	83,809
Other	841,725	222,206
Subtotal	$1,980,288	$660,965
$ Per Ton	69.78	85.29
$ Per lb. BeO	1.98	2.20

The General and Administrative Costs include the labor which is not specifically mine or mill related, royalty costs and miscellaneous costs for property taxes, insurance, employee travel, donations, etc.

G&A Labor:

Values have been listed for the production rates of 1,000,000 lb./yr. BeO and 300,000 lb./yr. BeO, see Figure No. 24 included in this report.

G&A Royalty:

The royalty paid to the State of Texas was negotiated by Cabot in a State Mining Lease dated October 1, 1986, attached. The effect of the royalty is to impose a $0.35 per pound of mined BeO payment to the State of Texas. The annual cost is, therefore, $388,888 and $116,667 for the 1,000,000 and 300,000 pound per year cases.

G&A Other:

The items such as property taxes, insurance, employee travel, etc., were not estimated individually. A review of the G&A costs for other Cyprus Metals properties indicate that the labor cost is 45% of the total G&A cost exclusive of royalty payments. On this basis, the annual G&A "Other" costs are estimated to be $450,389 and $376,689 respectively for the 1,000,000 and 300,000 pound per year cases.

Total General and Administrative Costs:

The total G&A costs are summarized below:

TABLE 8.7

TOTAL ANNUAL G&A COSTS

Item	1,000,000 Pound Per Year		300,000 Pound Per Year	
G&A:				
Labor	$ 368,500		$308,200	
Royalties	388,888		116,667	
Other	450,389		376,689	
Subtotal	$1,207,777		$801,556	
$ Per Ton		42.56		103.43
$ Per lb. BeO		1.21		2.67

Figure No. 22

SUMMARY OF OPERATING COSTS

Item	1,000,000 lb./Yr 28,380 Ton/Yr 1.94% BeO		300,000 lb./Yr 7,750 Ton/Yr 2.15% BeO	
Mine:				
Labor	$1,013,923		$ 354,950	
Power	124,640		83,809	
Equip. & Matl's	841,725		222,206	
Subtotal	$1,980,288		$ 660,965	
$ Per Ton		69.78		85.29
$ Per lb. BeO		1.98		2.20
Mill:				
Labor	$ 746,380		$ 651,240	
Utilities	1,166,352		318,465	
Reagents	1,087,771		303,231	
Oper. & Maint. Supply	285,556		78,043	
Tailings	141,900		38,750	
Misc.	95,924		26,195	
Subtotal	$3,524,114		$ 1,415,924	
$ Per Ton		124.18		182.70
$ Per lb. BeO		3.52		4.72
G&A:				
Labor	$ 368,500		$ 308,200	
Royalties	388,888		116,667	
Other	450,389		376,689	
Subtotal	$1,207,777		$ 801,556	
$ Per Ton		42.56		103.43
$ Per lb. BeO		1.21		2.67
Total:	$6,712,179		$2,878,445	
$ Per Ton		236.51		371.41
$ Per lb. Beo		6.71		9.59

Figure No. 23

MILL LABOR COST

Position	Quantity	Annual Salary	Total Salary
	1,000,000 POUND PER YEAR CASE		
Mill Supt.	1	$ 48,000	$ 48,000
Mill Oper. Foreman	3	35,000	105,000
Mill Maint. Foreman	1	35,000	35,000
Mill Operators	10	25,000	250,000
Mechanics	2	27,000	54,000
Inst./Elect.	1	27,000	27,000
Helpers	2	19,000	38,000
Subtotals	20		$557,000
Fringe @ 34%			189,380
Total Labor			$746,380
	300,000 POUND PER YEAR CASE		
Mill Supt.	1	$ 48,000	$ 48,000
Mill Oper. Foreman	3	35,000	105,000
Mill Maint. Foreman	1	35,000	35,000
Mill Operators	9	25,000	225,000
Mechanics	1	27,000	27,000
Inst./Elect.	1	27,000	27,000
Helpers	1	19,000	19,000
Subtotals	17		$ 486,000
Fringe @ 34%			165,240
Total Labor			$ 651,240

Figure No. 24
G & A LABOR COST

Position	Quantity	Annual Salary	Total Salary
1,000,000 POUND PER YEAR CASE			
General Manager	1	$ 60,000	$ 60,000
Lab Technician	2	25,000	50,000
Accountant	1	35,000	35,000
Purchasing Agent	1	25,000	25,000
Safety Rep	1	25,000	25,000
Nurse	1	20,000	20,000
Secretary	1	15,000	15,000
Security Guards	3	15,000	45,000
Subtotals	11		$ 275,000
Fringe @ 34%			93,500
Total Labor			$368,500
300,000 POUND PER YEAR CASE			
General Manager	1	$ 60,000	$ 60,000
Lab Technician	1	25,000	25,000
Accountant	1	35,000	35,000
Purchasing Agent	1	25,000	25,000
Safety Rep/Nurse	1	25,000	25,000
Secretary	1	15,000	15,000
Security Guards	3	15,000	45,000
Subtotals	9		$ 230,000
Fringe @ 34%			78,200
Total Labor			$308,200

FIGURE 25

ORGANIZATION CHART

1,000,000 LBS/YEAR

General Manager
- Secretary/Receptionist

Mine Superintendent

MINE OPERATIONS

Production Shifter (2)
- Engineer/Geologist (1)
- Surveyor (1)
- Lead Miner (2)
- Miner (2)
- U.G. Truck Drive (2)
- Surface Loader Operator (2)
- Grade Control Tech. (1)

MINE MAINTENANCE

Master Mechanic (1)
- Mechanics (2)
- Laborer (1)
- Electrician (1)

Mill Superintendent

MILL MAINTENANCE

Maintenance Foreman (1)
- Mechanics (2)
- Electrician/ Instru. (1)
- Maintenance Helper (2)

MILL OPERATIONS

Mill Foreman (3)
- Day Shift Operator (1)
- Grind/Filter Operator (3)
- SX/Reagents Operator (3)
- Product/Utilities Operator (3)

Office Manager/Accountant

GENERAL + ADMIN.

Purchasing/ Receiving (1)

Safety/Environmental (1)

Nurse (1)

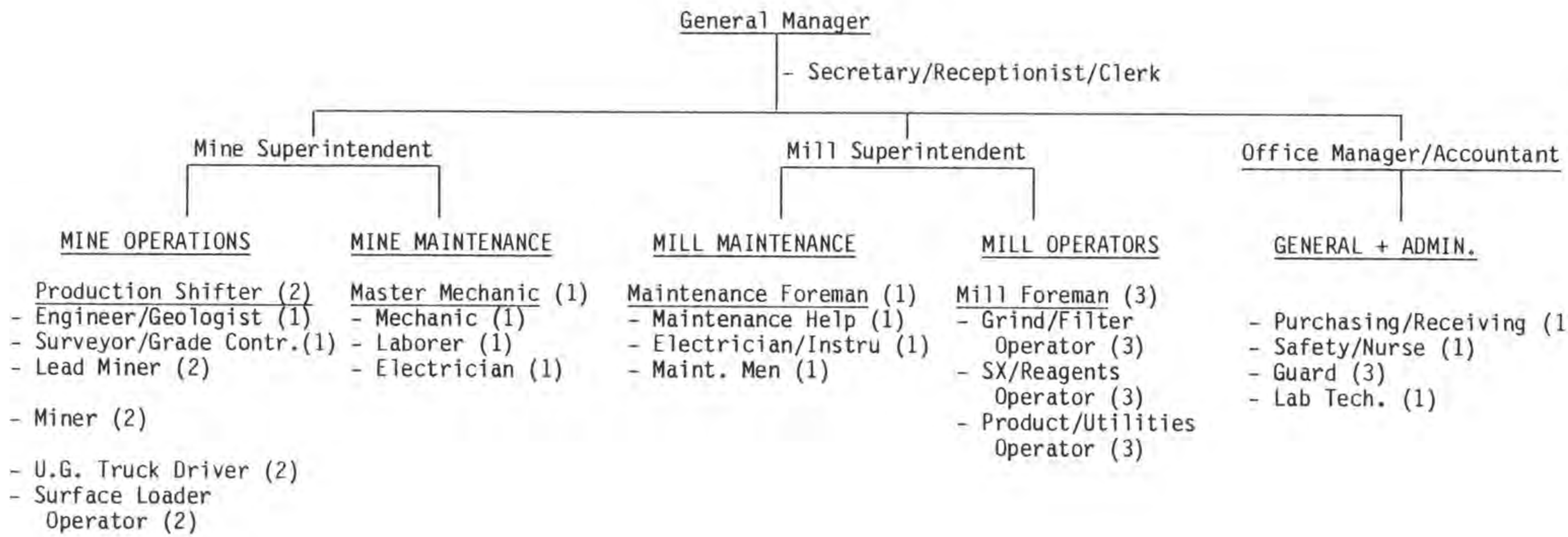
Guard (3)

Lab Tech (2)

FIGURE 26

ORGANIZATION CHART

300,000 LBS/YEAR



MINERAL-LAND POSITION

Introduction

The Sierra Blanca project in Hudspeth County, Texas currently comprises 25,000 acres and includes state prospecting permits, state mining leases, and fee mining leases. The following table portrays the breakdown in property categories:

Description of Property	Acres	Production Royalty	Current Holding Costs
State Prospecting Permits	16,320	N/A	$8,160 per year
State Mining Leases	7,040	61/4	$7,040 per year
Fee Mining Leases	2,939	8%	$10,895 per year

Cyprus has initiated negotiations with the State of Texas and private land owners for the purchase of 5,760 surface acres as indicated on Figure No. 27, included in this section of the report. This surface acreage will be utilized for the mine and mill facilities as well as an environmental fence-line boundary. Cyprus' discussions with the State of Texas have indicated that the State is willing to sell their 3,800 acres of surface for an appraised value of approximately $45.00 per acre. A private landowner (J.B./A-1) who controls 1,600 acres of surface in the project area has shown reluctance to negotiate for the sale of their surface interest. This owner controls 100,000+ acres of surface and minerals in the vicinity and would prefer Cyprus to purchase to the total package. Negotiations with this owner are continuing. The owner of the remaining 320 acres has agreed to a 30-year surface lease.

Cyprus has met with numerous State officials in the Mineral and Legal Services Divisions in order to familiarize the State with the project. We have received valuable support and assistance from the agencies involved in the process and anticipate the State to be extremely supportive of the project.

Current Activities

- Continue our negotiations for the acquisition of mining leases on the outstanding minerals interests in the project area.

- Continue our negotiations with J.B./A-1 for the purchase of 1,600 acres of surface within the project area.

- Convert seven sections of State Prospecting Permits into State Mining Leases. Negotiations with the surface owner, who by Texas State law is involved in establishing the fair market value of the lease, have been progressing slowly due to their desire to sell all their holdings in the Sierra Blanca region.

- To complete a boundary survey of the immediate Sierra Blanca project area. The survey will be necessary to resolve boundary questions between state and private land.

- Continue negotiations with J.B./A-1 for the purchase or lease of their water wells. These discussions have reached an impasse due to J.B./A-1's desire to sell the entire Mile High Ranch.

Future Objectives

- Identify and acquire alternative sites to develop sufficient water resources to meet project needs in the event that our discussions with J.B./A-1 are not successful.

- Consolidate landholdings as pictured on Figure No. 27, included in this section of the report, by the relinquishment of state prospecting permits which fall outside of proposed project area.

- Complete the purchase of all surface lands as indicated on Figure No. 27.

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ENVIRONMENTAL-PERMITS

Introduction

Cyprus Beryllium Corporation has been working since mid-1987 with Radian Corporation, an environmental consulting group, and Stearns-Roger, an engineering firm, to obtain construction and operating permits for a one million pound per year beryllium processing plant. Considerable design efforts are underway to make this operation essentially a non-discharge facility. Because of beryllium's potentially hazardous nature and strict state and federal emission standards, Cyprus is using the best available control technology, waste train recycling and state-of-the-art process design programs to minimize emissions. Ongoing projects are focusing on air quality, solid and hazardous waste management, waste water recycling and protection of employee health and hygiene.

Air Quality

Controlling beryllium air emissions is the primary environmental challenge at the Sierra Blanca project. The stringent, but attainable state emissions standard is .01 ug/m^3 for 24 hours or 10 grams of emissions (1/3 ounce) per day. The single most important permit enabling the start-up of the Sierra Blanca project is the Texas Air Control Board (TACB) "Construction Permit". In Texas, the TACB is the lead agency for administering Environmental Protection policies.

Baseline Air Monitoring

Starting in June of 1987, a baseline air monitoring program began. This baseline project was designed to measure pre-existing beryllium and total suspended particulate levels prior to actual mining and process plant activities. The primary site is located downwind of the project area, and provides meteorological as well as particulate emission information. The other two sites; one located upwind of the project and one located in the town of Sierra Blanca provide particulate information only, see Figure •28, included in this Section of the report. To date, beryllium has been detected 11 times in 87 samples over the first nine months of data collection at levels just above the analytical level of detection. This baseline information is being used to prepare Cyprus' application for the TACB construction permit.

Air Emission Control Equipment

Best available technology is used to recycle captured beryllium dusts and slurries from the emission control systems at Sierra Blanca's plant and mine sites. Known dust emission points in the plant and mine are first controlled with water spray. Remaining dusts are then collected in high efficiency fabric or cartridge bag houses. Captured dusts from these collectors are recycled through the system to recover beryllium. Water used for wetting is recycled for use in plant operations such as grinding and extraction, and for dust control at ore storage bins. Beryllium values are recovered as these fluids are recirculated through the process plant.

Vapor Control Methods

Ammonia and acid vapors will be controlled using scrubbers and wet wash systems. The residual ammonia recovered from solvent extraction and stripping circuits is being tested for suitability as a low cost ammonium sulfate fertilizer for local cotton growers. Alternatively, technology to recycle reconstituted ammonium carbonate would be used. Acid vapors are captured and recycled back to the leaching operation.

Water Discharge Controls

Process waters will not be discharged. Stormwater runoff, vehicle cleanup water and grey water from shower and laundry facilities will be used to control dusts from tailing wastes. Process spills will be contained within process areas and recycled by sump pumps. Waters from washdown, spillage and cleanup will be returned to the extraction process.

Solid Waste Management

The tailings from the chemical plant are of a non-hazardous nature, and a solid waste disposal permit should not be required. The Texas State Solid Waste Disposal Act permits non-hazardous industrial waste (such as generated by Cyprus' beryllium facility) to be disposed of within fifty miles of the facility, on lands owned or controlled by the operator. The Texas Water Commission (TWC) administers policy pertaining to solid waste disposal and has containment area design recommendation authority. Containment technology chosen for project design exceeds the minimum requirements of the State solid waste disposal statutes.

Solid waste management plans include provisions for wetting and covering to provide dust control. As the tailings are deposited in the plastic lined ponds, sprinklers are used to maintain moisture. In addition, tarps may be placed over pits to further reduce fugitive dusts until tailings become stable enough to allow reclamation by covering with dirt and rock. Waters captured in the bottom of these pits are recycled for use in dust control or as process water.

Heap leaching operations will leach low grade ore placed in lined containment pits. The potential for windblown dust emissions, occurs as evaporation dries the ore, will be minimized by wetting with leach solutions, augmented by rubberized tarps, similar to the dust elimination systems outlined for the tailing areas. Pregnant liquors recovered from the heap leaching operations are pumped to the process plant where beryllium is recovered.

Reclamation

As mining areas are depleted, and at the completion of operations, closure plans will be implemented to stabilize the site. Final closure will include preparing the site for an appropriate post-mining land use -- probably as wildlife habitat and livestock grazing areas.

Permit Acquisition Status

The permitting process is proceeding well. Agency review and approvals are expected to be completed prior to, or concurrent with, process plant and underground mine design plans. Permit approvals are anticipated by July, 1988.

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EMPLOYEE HEALTH AND HYGIENE

Protection of employee health has received top priority since the beginning of the project. The program includes extensive medical examinations, workplace air monitoring, hazard assessment, high efficiency dust collectors and respiratory protection, and employee training.

Medical Examinations

Pre-placement and annual medical examinations are given to screen employees and contractors for sensitivity to beryllium. Tests include chest x-rays, lung function, and lymphocyte transformation (LTT). Persons sensitive to beryllium are not allowed to work in areas with any potential exposure.

Workplace Air Monitoring

Routine workplace monitoring is conducted to ensure exposure levels to contaminants are kept as low as economically feasible and to continually evaluate the effectiveness of engineering controls. If workplace air monitoring indicates levels of beryllium in excess of 1 ug/m^3 (½ the current standard) efforts are directed to improve engineering controls. Employees wear respirators on all new job assignments until workplace monitoring establishes that the levels of contaminants are acceptable.

Engineering Controls

State of the art equipment is used to control beryllium exposure. This includes dust collectors and strategic use of water spray systems. Cyprus has been a pioneer in designing dust control systems for underground mining that keep exposures below the standard.

Respiratory Protection & Training

High efficiency (99.97%) powered air purifying respirators are used when contaminants are above acceptable levels. Employees receive extensive training on respiratory protection, safe job procedures, and hazard identification prior to beginning work and regularly thereafter.

Conclusion

Unless Cyprus knew the health of employees could be preserved, the company would not be involved in the beryllium business.

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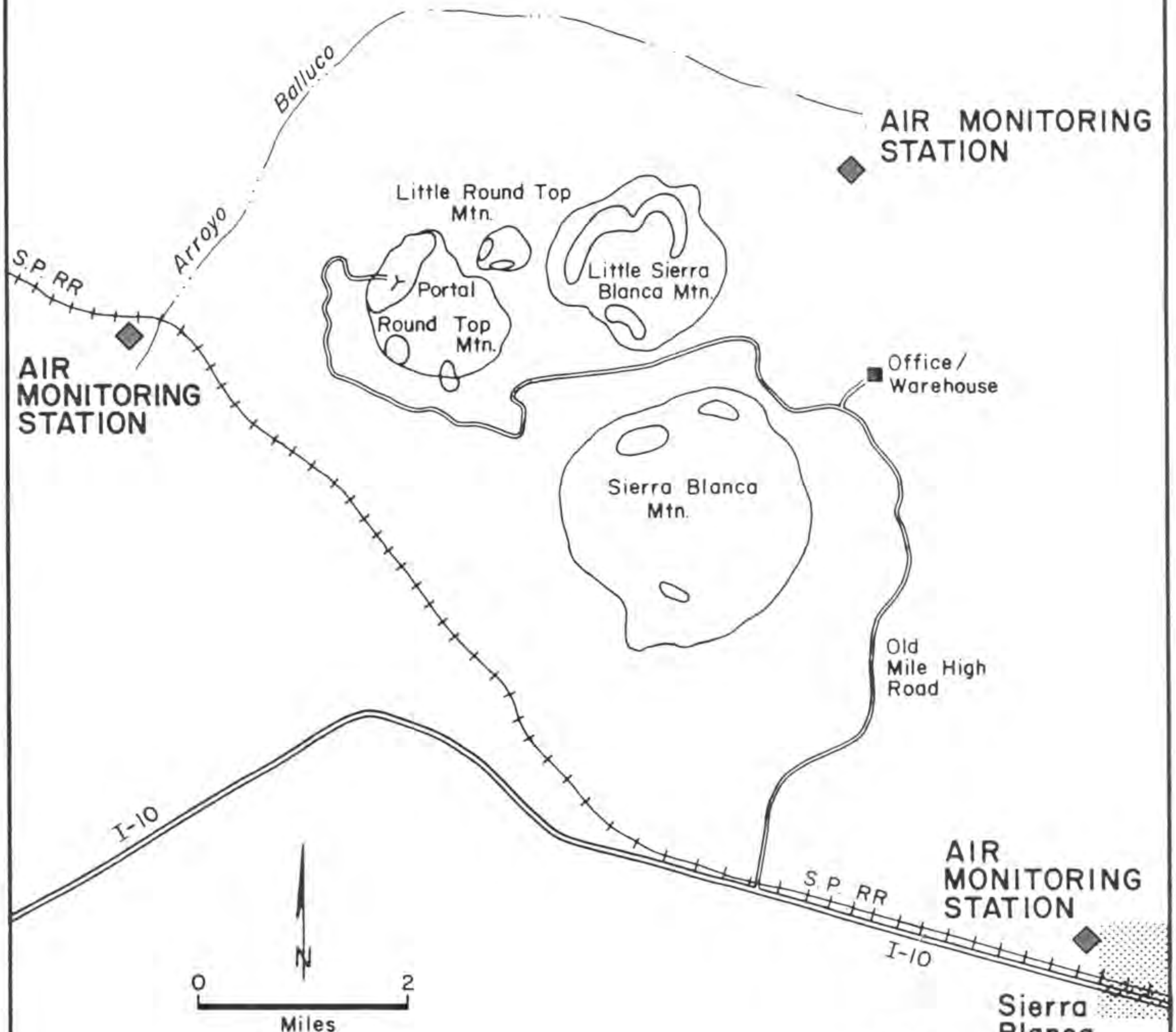
PROJECT LOCATION MAP
Showing Air Monitoring Stations



CYPRUS SIERRA BLANCA, INC.

SIERRA BLANCA PROJECT
HUDSPETH CO., TEXAS

FIGURE 28

FINANCIAL ANALYSIS

Revised economics for the Sierra Blanca project were prepared for three cases. Base and Downside marketing cases were used to prepare the economics for a 1,000,000 lb/yr BeO eq. operation, while the economics for the 300,000 lb/yr operation are based essentially on flat sales of 300,000 lb/yr.

In the Base case the majority of sales are provided by a contract with NGK. This contract is based on an initial product offtake of 400,000 lb/yr BeO beginning in the second half of 1989 and growing 6% annually until 1999. Additional sales are made to Olin for Cu-Be alloy production and to General Ceramics (ceramic-grade BeO). There is also a transfer of material shown for metal production. Total production reaches 1,000,000 lb/yr BeO eq. in 1999 (see Table 2).

In the Downside case, the sale/transfer of BeO units for Be-metal production is eliminated, and there is no sales growth beyond a total of 536,000 lb/yr BeO eq. In the 300,000 lb/yr case, the NGK contract sales are set at a level of only 270,000 lb/yr, with the only other sales contract being a 30,000 lb/yr contract with General Ceramics.

Base case net income and cash flow are shown in Table 3, with net cash flow totalling $128.3MM over the assumed 20-year life. Cumulative cash flow turns positive during 1993. Leveraged net income and cash flow for the Base case are shown in Table 4. The assumption made was that borrowing would be from the Cyprus/Chemical Bank revolving credit facility, and that the drawdown would be repaid as quickly as possible from positive cash flows generated by the project. Total drawdown from the revolver, including $1.5MM in interest charges, was $19MM. The final principal payment is made in 1994 under these assumptions.

Net income and cash flow for the Downside case are shown in Table 5. In this case, net cash flow totals $63.6MM over a 20-year mine life. Cumulative cash flow turns positive very late in 1993. Net income and cash flow for the 300,000 lb/yr case are shown in Table 6. Net cash flow totals only $32.7MM over the project life, and cumulative cash flow does not turn positive until late in 1995.

A summary of the project economics is shown in Table 7. Both point-forward and full cycle economics are shown for all three cases. The full cycle economics include the approximately $3.2MM spent by Cyprus at Sierra Blanca, but not amounts spent at AMT. The point-forward economics include only the funds that would be required to bring the property into production from a mid-1988 decision point. Both the Base and Downside cases show IRR values over 15% for both full cycle and point-forward economics, but the IRR values for the 300,000 lb/yr case are under 15% under both full cycle and point-forward economics.

Negotiations with NGK

Table 8 shows the BeO market prices necessary for the project to earn IRRs of 15 and 20% for both point-forward and full cycle economics. The flat 10% discount to NGK has been eliminated from the economics in order to generate these price ranges. If full cycle economics are considered, and Cabot retains a 20% net profits interest in the project (which is likely considering the buyout structure) then a BeO price of $16.71/lb BeO eq. is necessary to achieve a 20% IRR. A price of $13.51 will achieve a 15% IRR. The same scenario on a point-forward basis shows that a BeO price of $15.25/lb will yield a 20% IRR and a price of $12.56/lb will yield a 15% IRR. It is worth noting that the effect of the 20% Cabot NPI and $2.5MM payment is to add between $1.50 and $2.70/lb BeO to the prices required to generate the same IRRs. A complete buyout of the Cabot interest, requiring Cyprus to pay $12MM initially instead of $2.5MM, appears uneconomic. Offering NGK a discount on their offtake in the form of an NPI interest similar to Cabot's would cost only slightly more on a percent-for-percent basis than if NGK were sold a certain percentage of their contract requirements at cost.

The 300,000 lb/yr BeO operation appears very difficult to justify currently, even though this option shows a point-forward IRR of 13.4% (Table 7). As shown in Table 8, the BeO prices required to earn 15 and 20% IRRs are mostly above $20/lb BeO. In fact, Cyprus is likely to be asked to make price concessions resulting in average realizations well below $20/lb in order to win any supply contracts. It appears that a sales level above 300,000 lb/yr BeO will be required to justify a conventional mining/milling operation, as the project capital requirements are relatively insensitive to capacity between the 300,000 lb/yr and 1,000,000 lb/yr capacities.

Table 1

SIERRA BLANCA BERYLLIUM PROJECT ASSUMPTIONS

PROJECT LIFE - 20 Years

BASE CASE

• Mining Cost	-	Life-of-Mine average $69.32/ton
• Milling, G & A	-	As detailed in Stearns-Roger report, with adjustments to variable costs based on grade and mill throughput.
	-	LOM milling cost $3.93/lb, G&A $0.33/lb.
	-	Assume 70% recovery during start-up in second half of 1989; 90% thereafter.
• BeO Price	-	$20/lb BeO. Current market (Brush Wellman) price is $20-$21/lb BeO. Sales to NGK are at a 10% discount from market price. All other sales at market price.
• Capital Cost	-	$11.2MM mill and infrastructure, $4.5MM mine and development, $0.5MM land.
• Cabot Interest	-	Payment of $2.5MM in 1988 leaves Cabot with 20% NPI.

DOWNSIDE CASE

• Capital Cost	-	Full 1MM lb/year capacity not built, $1.5MM in capital delayed indefinitely.
• Sales	-	No Be-metal sales/transfers, maximum production and sales of 536M lb/year.

300M LB/YEAR CASE

• Mining Cost	-	Life-of-Mine average $89.60/ton.
• BeO Price	-	No discount on sales to NGK, all sales at $20/lb BeO.
• Capital Cost	-	$8.3MM mill and infrastructure, $4.2MM mine and development, $0.5MM land.

Table 2

SIERRA BLANCA BERYLLIUM PROJECT
PRODUCTION AND MARKETING DETAIL

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Average '99-'09	Total
BASE CASE													
NGK sales (M lb)	-	200	424	449	476	505	535	567	601	637	675	680	12,549
Olin sales	-		50	75	100	106	112	119	126	134	142	142	2,526
General Ceramics	-	30	32	34	36	38	40	43	45	48	51	51	957
Be-metal	-			60	90	95	101	107	113	120	127	127	2,210
Total sales	-	230	506	618	702	744	788	836	885	939	995	1,000	18,242
Market Price ($/Lb)	-	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	
NGK price	-	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	
Ore grade, %BeO	-	2.46	2.30	2.20	1.95	1.73	1.59	1.65	2.25	2.13	1.94	1.94	
Total Cost	-	9.36	8.67	7.96	8.04	8.36	8.61	8.44	7.72	7.45	7.50	7.50	7.72
Plus Cabot NPI	-	11.14	10.60	10.08	10.16	10.42	10.62	10.48	9.90	9.69	9.73	9.72	9.90
DOWNSIDE CASE													
NGK sales (M lb)	-	200	400	400	400	400	400	400	400	400	400	400	8,200
Olin sales	-		50	75	100	100	100	100	100	100	100	100	1,925
General Ceramics	-	30	32	34	36	36	36	36	36	36	36	36	743
Total sales	-	230	482	509	536	536	536	536	536	536	536	536	10,868
Ore grade, %BeO	-	2.46	2.23	2.20	2.02	1.92	1.65	1.58	1.64	1.66	2.07	2.02	
Total Cost ($/Lb)	-	9.90	9.49	9.10	9.21	9.39	10.00	10.18	10.15	10.12	9.77	9.48	9.59
Plus Cabot NPI	-	11.57	11.26	10.96	11.07	11.21	11.70	11.85	11.82	11.80	11.52	11.28	11.37
300M LB/YEAR CASE													
NGK sales (M lb)	-	100	270	270	270	270	270	270	270	270	270	270	5,500
General Ceramics	-	15	30	30	30	30	30	30	30	30	30	30	615
Total sales	-	115	300	300	300	300	300	300	300	300	300	300	6,115
Ore grade, %BeO	-	2.63	2.46	2.46	2.40	2.32	2.27	2.16	1.90	1.90	1.86	2.12	
Total Cost ($/Lb)	-	11.84	11.34	11.86	11.85	11.86	11.78	11.96	12.45	12.39	12.47	11.97	11.98
Plus Cabot NPI	-	13.47	13.08	13.49	13.48	13.49	13.42	13.57	13.96	13.91	13.98	13.58	13.58

Table 3

SIERRA BLANCA BERYLLIUM PROJECT
BASE CASE NET INCOME AND CASH FLOW
($MM)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	Average 1998-09	Total
Net Income												
Total Revenue	-	4.2	9.3	11.5	13.1	13.9	14.7	15.6	16.5	17.5	18.6	339.7
Mining & Milling	-	1.6	3.4	3.7	4.3	4.9	5.4	5.6	5.3	5.4	5.8	109.0
State Royalty	-	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	7.1
SG&A	-	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	6.6
DD&A	-	0.2	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0	18.2
Cabot NPI	-	0.4	1.0	1.3	1.5	1.5	1.6	1.7	1.9	2.1	2.2	39.8
Income Before Tax	-	1.6	3.9	5.2	6.0	6.1	6.3	6.8	7.7	8.4	8.9	159.1
Tax Expense	-	0.5	1.3	1.3	1.4	1.2	1.2	1.3	1.4	1.6	1.6	30.8
Net Income	-	1.2	2.6	3.9	4.6	4.9	5.1	5.5	6.3	6.8	7.3	128.3
Cash Flow												
Net Income	-	1.2	2.6	3.9	4.6	4.9	5.1	5.5	6.3	6.8	7.3	128.3
Non-Cash Charges	-	0.6	2.0	1.6	1.3	1.1	1.1	1.1	1.0	0.7	0.6	18.2
Funds Available	-	1.8	4.6	5.5	5.9	6.0	6.2	6.6	7.3	7.5	7.9	146.5
Capital Cost	4.3	11.9	-	-	-	-	-	-	-	-	-	15.7
Cabot Payments	2.5	-	-	-	-	-	-	-	-	-	-	2.5
Working Capital	-	0.6	0.7	0.3	0.2	0.1	0.1	0.1	0.1	0.1	(0.2)	-
Net Cash Flow	(6.8)	(10.7)	3.9	5.2	5.7	5.9	6.1	6.5	7.2	7.4	8.2	128.3
Cumulative Cash Flow	(6.8)	(17.5)	(13.6)	(8.4)	(2.7)	3.2	9.3	15.8	23.0	30.4		

Table 4

SIERRA BLANCA BERYLLIUM PROJECT
BASE CASE - LEVERAGING EFFECTS
($MM)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	Average 1998-09	Total
Net Income												
Net Income - Unleveraged	-	1.2	2.6	3.9	4.6	4.9	5.1	5.5	6.3	6.8	7.3	128.3
After Tax Interest	-	-	(1.1)	(1.0)	(0.6)	(0.3)	(0.1)	-	-	-	-	(3.2)
Additional DD&A	-	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(1.5)
Net Income - Leveraged	-	1.1	1.5	2.8	3.9	4.5	4.9	5.5	6.3	6.8	7.2	123.6
Cash Flow												
Net Cash Flow - Unleveraged	(6.8)	(10.7)	3.9	5.2	5.7	5.9	6.1	6.5	7.2	7.4	8.2	128.3
Capitalized Interest	(0.2)	(1.3)	-	-	-	-	-	-	-	-	-	(1.5)
After Tax Interest	-	-	(1.1)	(1.0)	(0.6)	(0.3)	(0.1)	-	-	-	-	(3.2)
Drawdown/(Repayment)	7.0	12.0	(2.9)	(4.2)	(5.1)	(5.6)	(1.3)	-	-	-	-	0.0
Net Cash Flow - Leveraged	0.0	0.0	0.0	0.0	0.0	0.0	4.7	6.5	7.2	7.4	8.2	123.6

Table 5

SIERRA BLANCA BERYLLIUM PROJECT
DOWNSIDE CASE NET INCOME AND CASH FLOWS
($MM)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	Average 1998-09	Total
Net Income												
Total Revenue	-	4.2	8.8	9.4	9.9	9.9	9.9	9.9	9.9	9.9	9.9	201.0
Mining & Milling	-	1.6	3.3	3.3	3.6	3.7	4.0	4.1	4.1	4.1	3.7	76.7
State Royalty	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	4.3
SG&A	-	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	6.6
DD&A	-	0.4	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	16.7
Cabot NPI	-	0.4	0.9	0.9	1.0	1.0	0.9	0.9	0.9	0.9	1.0	19.3
Income Before Tax	-	1.5	3.4	3.8	4.0	3.9	3.6	3.6	3.6	3.6	3.9	77.4
Tax Expense	-	0.4	1.2	1.1	0.9	0.8	0.7	0.7	0.7	0.5	0.6	13.8
Net Income	-	1.1	2.2	2.7	3.1	3.1	2.9	2.9	2.9	3.1	3.3	63.6
Cash Flow												
Net Income	-	1.1	2.2	2.7	3.1	3.1	2.9	2.9	2.9	3.1	3.3	63.6
Non-Cash Charges	-	0.7	2.0	1.7	1.4	1.1	1.1	1.1	1.0	0.6	0.5	16.7
Funds Available	-	1.8	4.2	4.4	4.4	4.2	4.0	3.9	3.9	3.7	3.8	80.3
Capital Cost	4.3	10.4	-	-	-	-	-	-	-	-	-	14.2
Cabot Payments	2.5	-	-	-	-	-	-	-	-	-	-	2.5
Working Capital	-	0.6	0.6	0.1	0.1	-	-	-	-	-	(0.1)	-
Net Cash Flow	(6.8)	(9.2)	3.6	4.3	4.3	4.2	4.0	3.9	3.9	3.7	3.9	63.6
Cumulative Cash Flow	(6.8)	(16.0)	(12.4)	(8.1)	(3.8)	0.4	4.4	8.3	12.1	15.8		

Table 6

SIERRA BLANCA BERYLLIUM PROJECT
300M LB/YEAR CASE NET INCOME AND CASH FLOW
($MM)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	Average 1998-09	Total
Net Income												
Total Revenue	-	2.3	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	122.3
Mining & Milling	-	0.9	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	49.8
State Royalty	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.4
SG&A	-	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	6.0
DD&A	-	0.2	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	15.0
Cabot NPI	-	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	9.8
Income Before Tax	-	0.8	2.1	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	39.3
Tax Expense	-	0.2	0.7	0.6	0.5	0.4	0.4	0.4	0.3	0.2	0.2	6.5
Net Income	-	0.6	1.4	1.3	1.4	1.5	1.5	1.5	1.5	1.6	1.7	32.8
Cash Flow												
Net Income	-	0.6	1.4	1.3	1.4	1.5	1.5	1.5	1.5	1.6	1.7	32.8
Non-Cash Charges	-	0.6	1.8	1.4	1.2	1.0	1.0	0.9	0.8	0.5	0.5	15.0
Funds Available	-	1.2	3.2	2.7	2.6	2.5	2.5	2.4	2.3	2.1	2.2	47.8
Capital Cost	4.3	8.7	-	-	-	-	-	-	-	-	-	12.5
Cabot Payments	2.5	-	-	-	-	-	-	-	-	-	-	2.5
Working Capital	-	0.3	0.5	-	-	-	-	-	-	-	(0.1)	-
Net Cash Flow	(6.8)	(7.8)	2.7	2.7	2.6	2.5	2.5	2.4	2.3	2.1	2.3	32.8
Cumulative Cash Flow	(6.8)	(14.6)	(11.9)	(9.2)	(6.6)	(4.1)	(1.6)	0.8	3.1	5.2		

Table 7

SIERRA BLANCA BERYLLIUM PROJECT
ECONOMICS SUMMARY

	Point-Forward		Full Cycle	
	PV15($MM)	IRR(%)	PV15($MM)	IRR(%)
BASE CASE	15.4	25.2	12.9	22.6
Delay construction of some mill capacity	1.5		1.5	
No sales growth beyond 536M lb BeO/year	(11.8)		(11.8)	
DOWNSIDE CASE	5.1	19.9	2.6	17.2
300M LB/YEAR CASE	(1.4)	13.4	(3.8)	11.2
SENSITIVITY TO NGK DISCOUNT IN BASE CASE				
• Increase NGK Discount to 15%	13.6	24.1	11.0	21.6
• Increase NGK Discount to 20%	11.7	23.0	9.2	20.5

NOTE: Maximum NGK discount from $20/lb market price to achieve 15% IRR is 52.1%.

NOTE: Minimum market price with Base Case NGK discount to achieve 15% IRR is $13.53/lb.

Table 8

SIERRA BLANCA BERYLLIUM PROJECT
SALES NEGOTIATIONS ALTERNATIVES

	Sales Price per lb Required to Earn:			
	Point-forward		Full Cycle	
1MM lb/yr plant, 400M lb/yr NGK baseload	**15% IRR**	**20% IRR**	**15% IRR**	**20% IRR**
Without Cabot NPI	$10.99	$12.85	$11.79	$14.05
20% Cabot NPI ($2.5MM pmt)	$12.56	$15.25	$13.51	$16.71
Cabot buyout ($12MM pmt)	$14.69	$18.23	$15.53	$19.46
Sensitivity for 20% Cabot NPI:				
Capital +10%	$13.01	$15.93	$14.06	$17.52
Capital -10%	$12.11	$14.58	$12.96	$15.88
20% of NGK sales at cost	$13.32	$16.47	$14.39	$18.14
10% at cost + 10% NPI	$13.47	$16.66	$14.57	$18.36
300M lb/yr plant				
Without Cabot NPI	$17.76	$20.79	$19.90	$23.75
20% Cabot NPI ($2.5MM pmt)	$21.37	$26.07	$23.92	$29.63

PROJECT DEVELOPMENT - PHASE II

Ore reserves and grade values have been delineated. We have a highly fractured, high yet variable grade orebody. Additional drifting and drilling is required to increase the probable reserves.

A unique mining plan has been tailored to the characteristics of the ore reserves. Economical recovery with a minimum of dilution is assured.

Grinding, leaching, liquid-solids separation, and solvent extraction tests have been performed in individual manners on Sierra Blanca ore, producing satisfactory results. It is recognized the separate tests fell short of determining optimum conditions thus did not determine design criteria. Such values can only be achieved by a fully integrated test with full recycles. Plans for such a test are being formed.

Two short rough column leach tests, selected for their potential for leaching below cutoff grade ore, provided encouraging recovery values, ± 60% after a short period of two months. Additional refined tests will be conducted to again optimize the heap leach techniques, improve on yields, determine best flow rates, leaching patterns, size and shape of heap, etc.

Our best entry into the beryllium hydroxide market is via conditional contracts. Yearly sales commitments will no doubt be low. The mine and mill capacity can be designed and operated in concert with low annual market production requirements. A low production rate can be effectively achieved by adopting a heap leach scheme for processing primary ore. The facilities for grinding, leaching, and liquid-solids separation can be deferred. Lower capital and operating costs will be achieved. On-site heap leaching tests are planned to best duplicate the leaching environment.

A long range strategy should be adopted for Cyprus participation in all sectors of the beryllium industry chain. An active program for the conversion to beryllium metal should be pursued. There is not doubt a commonality may exist between the conversion process to produce beryllium metal and that used for producing lithium metal. It is quite possible that a common conversion plant should be established under the banner of Cyprus, Foote Minerals, or perhaps AMT by which to achieve these production goals.

Land and mineral acquisitions should be completed. Reasonable time should be afforded to permit the Texas agencies and authorities the opportunity to assist in our programs. If legal action is regarded as least probable to be successful, then the alternative sites of "B" or "C" should be reviewed, a selection made and positive actions taken.

Permit application should be released. It is possible that amended plans for processing ore, only by heap leaching, may require amendments to the application.

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