UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
WASHINGTON 25, D. C.

224 New Customhouse
Denver 2, Colorado

September 5, 1952

Memorandum

To: Secretary to the Operating Committee

From: Field Team, Region IV

Subject: Final Report, DMEA Docket 2581, (Beryl-Mica-Columbite-Tantalite) Beryllium Mining Co., Inc., Gunnison County, Colorado

Enclosed are the original and three copies of the report pertaining to the above application.

The applicant had requested exploration aid in the amount of $49,685.09.

The field examiners believe that the project is geologically unsound and that it is not feasible from an engineering or economics standpoint and they recommend that this application be denied.

We concur in this recommendation.

W. H. King
W. H. King

A. H. Koschmann
A. H. Koschmann

Encl.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Mining Division
Region IV

September 4, 1952

Memorandum

To: Field Team, Region IV

From: Acting Chief, Mining Division, Region IV

Subject: Final Report, DMEA Docket 2581, (Beryl-Mica-Columbite-Tantalite) Beryllium Mining Co., Inc., Gunnison County, Colo.

Enclosed are eight copies of the memorandum report on DMEA-2581 by H. L. McLellan of the Bureau of Mines.

This application was referred to U.S.G.S. for preliminary examination and they denied it on geological grounds.

The examining engineer believes this project is not feasible from an engineering or economic standpoint and he recommends denial.

We concur in this recommendation.

W. H. King
W. H. King

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
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SEP 8 1952

Encl.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Region IV

Room 1JY, Building 20
Denver Federal Center
Denver 14, Colorado
August 25, 1958

Memorandum

To: Executive Officer, Field Team, Region IV

From: Chief, Colorado Branch, Mining Division, Region IV

Subject: DMEA 2981 (Beryl-mica-columbite-tantalite), Beryllium Mining Company, Inc., Gunnison County, Colorado

Please find enclosed the original and eight copies of a memorandum by Russell R. McLellan covering the subject loan application.

Inasmuch as the application was referred to the Survey for preliminary examination and they denied it on geological grounds, we have prepared this memorandum covering mainly the salient points because the examination was made by the same team who were investigating another application on a nearby property.

McLellan concludes that the applicant's operations up to the present have been unprofitable and will continue to be unless a market is found for the mica constituents of the pegmatite to support production of the critical minerals, beryl and columbite. This is a condition obtaining in all Colorado pegmatites. In addition to being geologically unsound, a project is not feasible from an engineering or economic standpoint. We recommend denial and I concur.

The possibility of stimulating the applicant's production by means of a price subsidy equivalent to the DMEA loan participation is worthy of consideration.

W. M. Traver, Jr.

W. M. Traver, Jr.

enclosures

WMT/mmb

cc: 5
DMEA 2981
DMEA Chron.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION
WASHINGTON 25, D. C.

200 New Customhouse
Denver 2, Colorado

August 29, 1952

Memorandum

To: DMEA Field Team, Region IV

From: A. H. Koschmann

Subject: DMEA Docket 2581, Beryllium Mining Company, Inc., New Anniversary Pegmatite, Willow Creek Mine, Gunnison County, Colorado.

Attached are 8 copies of the geological report by E. N. Hershman covering DMEA Docket 2581, Beryllium Mining Company, Willow Creek Mine, Gunnison County, Colorado

The applicant proposes to explore for beryl, columbite, and tantalite on subject property by 2500 feet of diamond drilling and some trenching as needed to expose favorable near-surface contacts of graphic granite and quartz core

The present field investigation, together with rather extensive investigations of these pegmatite dikes made after World War II by the U. S. Geological Survey and the U. S. Bureau of Mines, show that the deposits are lenticular and sporadic. Exploration might lead to the discovery of additional deposits However, such ore zones would lie at greater depth than those presently known and unmined. The known deposits have not been exploited because of operating costs and lack of market for the by-products, as feldspar This entire case is not a problem of finding ore, but of marketing Hershman, therefore, recommends that this application be denied.

I concur in this recommendation.

A. H. Koschmann

A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (8)

BERYLLIUM MINING COMPANY, INC.

NEW ANNIVERSARY PEGMATITE

WILLOW CREEK MINE

GUNNISON COUNTY, COLORADO

DMEA DOCKET 2581

Geologic Report

Reviewed by
DMEA OPERATING COMMITTEE

_____
(date)

By E. N. Harshman
U. S. Geological Survey

BERYLLIUM MINING COMPANY, INC.
GUNNISON COUNTY, COLORADO

INTRODUCTION

The Beryllium Mining Company, Inc., 820 2nd Avenue, Seattle 4, Washington, has requested government assistance, DMEA Docket 2581, in exploring for beryl, columbite, and tantalite, on 6 claims in section 22, T. 50 N., R. 3 E., N. M. P. M., Gunnison County, Colorado. They have under lease the South Slope No. 1 and No. 2 lode claims, and have a contract to purchase the Bucky, Rhona Marie, Pug, and Sally lode claims (Fig. 1).

The property lies about 1.3 miles northwest of Ohio City, Colorado, and may be reached by car over 1.8 miles of good dirt road which joins State Highway No. 165 at a point about 0.9 of a mile west of Ohio City.

The proposed exploration consists of drilling 2500 feet of Nx size diamond drill holes and excavating tranches or open cuts as needed to expose near-surface contacts of graphic granite and quartz core. The total cost of the exploration, including supervision, repair of equipment now at the mine, rental and purchase of additional equipment, assaying, and various other items, is estimated by the applicant to be $49,685.09 (Government participation 90 percent).

A former request, DMA Docket 495, for assistance in exploring this property, at an estimated cost of $250,000, was denied without being referred to the Field Team.

The claims were examined on August 1, 1952, in company with R. R. McClellan and R. D. Berkenkotter of the U. S. Bureau of Mines. Mr. C. A.

Hamlinger, P. O. Box 276, Gunnison, Colorado, Manager of the property, accompanied the examining team; his assistance is acknowledged.

It is concluded: 1. that exploration assistance will not lead to an increased production of beryl, columbite, or tantalite from this property; 2. that the known bodies of ore have not been exploited to the fullest extent possible; and 3. that at present metal prices, mining operations have not and cannot yield a profit.

GEOLOGY

The geology of the Quartz Creek pegmatite district, including the Beryllium Mining Company's property, has been described in some detail by Staatz and Trites (1952). The following geologic discussion is based, to a considerable extent, upon their findings.

The Quartz Creek pegmatite district includes about 29 square miles in the vicinity of Quartz Creek, Gunnison County, Colorado. The area contains 1803 known pegmatites that have been intruded into pre-Cambrian quartzite, hornblend gneiss, tonalite, granite, and quartz monzonite. The composition of the country rock has little to do with the shape of the pegmatite, provided the rocks being compared are of equal competency; structural control is, however, quite common. Well-zoned pegmatites are not common and in those few that are zoned, the cores are small and discontinuous and the wall zones are large.

The New Anniversary pegmatite (the Bucky or No. 1574 pegmatite in the Staatz and Trites report) is about 4000 feet long, 2500 feet wide, and is intruded into hornblend gneiss. The pegmatite is very irregular in shape and by far the larger part of it is either a fine-grained, discontinuous wall zone or a coarse-grained, graphic granite intermediate zone. Thirty-six

quartz core segments have been found within the pegmatite dike. The core segments have a peripheral arrangement about the dike (fig. 1) and some may be fissure fillings rather than true core segments.

The wall zone is not continuous. It is entirely absent in some places and several hundred feet thick in others. It is composed of 60% albite, 20% perthite, 16% quartz, and 4% muscovite in grains averaging about one-quarter of an inch in diameter.

A thick intermediate zone of graphic granite lies inside the wall zone. In addition to graphic granite, this zone contains 3% to 6% perthite, 3% fine-grained albite, 1% crystalline quartz, and less than 1% biotite.

One to three minor intermediate zones surround most of the core segments. These zones are coarse grained (crystals up to 3 feet in diameter) and contain quartz, albite, perthite, muscovite, and relatively minor amounts of beryl, columbite, tantalite, monazite, and a euxenite-like mineral.

The principal workings are on the Bucky claim, where 4 open cuts have exposed 2 moderate sized core segments and their accompanying ore-bearing intermediate zones. The upper or Bucky core segment is composed of white massive quartz in a body 100 feet long, 75 feet wide, and about 40 feet thick. The quartz core is surrounded by a 1 to 10 foot intermediate zone of quartz, feldspar, and muscovite with an average grain size of about 2 feet. In this zone beryl occurs in crystals up to several feet in diameter; the other ore minerals occur in smaller crystals. At the time of examination, all exposed ore minerals had been removed. Staatz and Trites estimate that the ore bearing zone contained 40% muscovite, 31% feldspar, 20% quartz, 0.9% beryl, and 0.11% columbite-tantalite. Beryl occurs in small, isolated,

pocket like segregations, each separated from the other by almost barren rock. The columbite and tantalite occur similarly, but not mixed with the beryl.

About 600 feet southeast of the Bucky core segment, a second deposit has been exposed by an open cut. Geologically this deposit is similar to the first and beryl, columbite, and tantalite have been mined from it. The workings on this deposit are not extensive.

Two open cuts on the South Slope No. 1 and No. 2 claims have exposed quartz-feldspar-muscovite zones that contain both beryl and columbite (fig. 1). Little work has been done in this area and it is not possible to estimate the extent of the ore zone. There is a possibility that the lower open cut has been excavated on material not in place.

PRODUCTION AND ORE RESERVES

The following production figures, given by the applicant, are believed to be reasonably accurate:

Mineral	Prior to 1949	1949	1950	1951	1952	Total
Beryl (tons)	10	18.5	26.0	3.5	none	58.0
Columbite (lbs.)	--	1034.0	none	620.0	none	1654.0
Monazite (lbs.)	--	28.0	19.0	14.0	none	61.0
Scrap mica (tons)	--	97.5	64.2	42.1	none	203.8

Ore reserve estimates for pockety beryl deposits are at best very approximate, since they are based to a large extent on mineral counts and the judgment of the examiner. Weighting the production to date, the mineral count of prior investigations, and the volume of material yet to

be mined and known to contain beryl, columbite, and tantalite, ore reserves are estimated as follows:

TYPE	BERYL	COLUMBITE-TANTALITE
Measured ore	none	
Indicated ore	50 tons	1500 lbs.
Inferred ore	75 tons	2250 lbs.

PRIOR EXPLORATION

In 1950 the U. S. Bureau of Mines explored, by diamond drill, several of the more promising pegmatites in the Quartz Creek district. Their program included exploration of the New Anniversary pegmatite, particularly in the Bucky core segment area. Two drill holes, one in the core and one just south of it proved that the core extended to a depth of only 40 feet. The exploration program was suspended and the equipment was used to explore other pegmatites in the district.

The fact that the Bucky core segment is the largest yet discovered in the New Anniversary pegmatite, that its depth is only 40 feet, and that all other known core segments are of very short strike length suggests that most of the ore deposits associated with core segments in this pegmatite will be small.

CONCLUSIONS AND RECOMMENDATIONS

1. Beryl, columbite, and tantalite are present in intermediate zones surrounding several of the core segments in the New Anniversary pegmatite.

2. Reserves of between 50 and 125 tons of beryl and 1500 to 3750 pounds of columbite-tantalite are estimated to remain in known ore zones.

3. Exploration by drilling might lead to the discovery of additional intermediate zones containing beryl, columbite, and tantalite. However, such ore zones would lie at greater depths than the presently known and unmined ores, and because of high mining costs their discovery would not increase the beryl, columbite, or tantalite production from the property or the minable reserves.

4. To be successful mining operations on the New Anniversary pegmatite must include the sale of the other pegmatite minerals as well as beryl, columbite, and tantalite. The location of the property precludes such sale at a profit, at least at present prices.

5. A comparison of estimated production costs and gross receipts from the sale of all products mined by the Beryllium Mining Company, Inc., shows a net loss for the 4 year period of operation.

6. Production of beryl, columbite, and tantalite from the New Anniversary pegmatite can be stimulated only by an increase in the price of the products mined, or by non-recoverable financial assistance in the mining operations.

It is recommended, for the reasons outlined above, that the application for exploration assistance, DMEA Docket 2581, be denied.

REFERENCE

Staatz, M. H., and Trites, A. F., Geology of the Quartz Creek pegmatite district, Gunnison County, Colorado: U. S. Geological Survey, Trace Elements Investigations Report 138, April 1952.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Region IV

Room 137, Building 20
Denver Federal Center
Denver 14, Colorado
August 25, 1952

Memorandum

To: Chief, Colorado Branch, Mining Division, Region IV

From: Russell R. McLellan

Subject: DMEA 2581 (Beryl-mica-columbite-tantalite), Beryllium Mining Company, Inc., Gunnison County, Colorado

The Beryllium Mining Company, Inc., of Seattle, Washington, has applied for DMEA aid to explore for beryl, mica, columbite, and tantalite in the New Anniversary-Rocky Pegmatite, Gunnison County, Colorado. The applicant company proposes to spend $49,685.00 to drill 2,500 feet of core holes and to dig several surface trenches and pits. The Government's share of the cost would amount to $44,716.50, or 90 percent of the total.

The pegmatite was examined on August 1, 1952, by E. N. Harshman, USGS, and R. R. McLellan and R. D. Berkenkotter, USBM, accompanied by C. A. Wenlinger, vice-president of the company. It was concluded that the proposed program of exploration is not justified geologically and is not feasible from an engineering point of view.

The pegmatite is on Willow Creek in the Gold Brick Mining District, 21 miles east of Gunnison, Colorado, and about 1 mile from Ohio City and Colorado State Highway 162. Most of the dike is exposed on rolling, sparsely timbered hills at altitudes ranging from 8,800 feet to 9,500 feet.

The first location was made in 1943, but little or no production resulted until 1949 when the Beryllium Mining Company, Inc., commenced operations. From 1949 through 1951, the company shipped 200.2 tons of scrap mica, 16 pounds of monazite, 48 tons of beryl, and 1,595 pounds of columbite. With this production, the company probably grossed less than $30,000.00 for the 3-year operation, or about $10,000.00 per year. This amount is barely sufficient to cover labor and supervision charges alone. Obviously, the company was no more than meeting expenses at the peak of production.

Six claims controlled by the company cover about half of the pegmatite. Four of the claims, Bucky, Rhona Marie, Pug, and Sally, are being purchased from Rodney W. Fields, of Paonia, Colorado. The remaining two, South Slope Nos. 1 and 2, are leased from F. A. Nichols, of Evergreen, Colorado.

The pegmatite is about 4,000 feet in length and attains a maximum width of about 2,500 feet. Three major zones have been identified by the U. S. Geological Survey: a wall zone of quartz-microcline-muscovite, an intermediate zone of muscovite-plagioclase pegmatite that contains beryl and columbite, and a core of quartz pegmatite. The intermediate zone is the only portion of the dike that contains strategic minerals. Several extremely limited and isolated exposures of this zone were located in the extensive pegmatite outcrop. As nearly as could be determined, none of the exposures had been completely explored or developed. All beryl and columbite production has come from shallow cuts and trenches with no attempt being made to follow the zone at depth.

Without doubt, there is a mineable reserve in most of the principal workings at the south edge of the pegmatite. If the company cannot mine this surface reserve profitably, there is little or no possibility that it can profitably mine any deep-seated reserve established by core drilling. In short, unless large quantities can be marketed of non-essential minerals, such as scrap mica, graphic granite, or feldspar, the dike is comparatively worthless as a source of beryl and columbite. Present freight rates in the area are prohibitive to the production of low value, nonstrategic minerals; consequently, there has been no mining on the property during the 1952 season.

Following is a summary of the estimated costs of a 10-month exploration program of drilling and trenching as submitted by the applicant:

Construct cinder block building	$2,000.00
Operating equipment rented	1,608.44
Diamond drilling, 2,500 feet by contract	20,730.00
Supervision	5,000.00
Labor	8,170.00
Overhaul bulldozer and truck	3,870.00
Supplies	2,674.10
Assaying	1,000.00
Accounting	500.00
Engineering	1,000.00
Miscellaneous	3,132.55
Total	$49,685.09

The estimated cost is excessive by at least $8,800.00 which includes such items as a 22- by 40-foot cinder block building, mobilization and demobilization by drill contractor, and overhaul of bulldozer and truck.

According to the applicant, the ultimate purpose of the diamond drilling is to establish the existence of deep-seated zones which may

prove the feasibility of driving a low level tunnel to tap these zones. It is the writer's opinion that the 10 to 14 holes comprising 2,500 feet of drilling would be only a fraction of the number required to prove sufficient reserves to merit a low level tunnel. The calculated reserves would have to be in tons of mica and feldspar rather than in pounds of beryl and columbite due to the isolated and erratic occurrence of the latter minerals within the intermediate zone.

The cost of an extensive drilling program combined with the cost of a low level tunnel could be offset only by locating a market for a tremendous tonnage of nonstrategic minerals. It is extremely doubtful that any great amount of the intermediate zone exists within the proposed drilling range of 200 to 250 feet from the surface. When it is considered that possibly 5,000,000 square feet of pegmatite are exposed through a vertical range of several hundred feet compared to possibly 3,000 square feet of exposed ore-bearing zone, there is little chance of discovering additional ore even with closely spaced, systematic, pattern drilling, much less with only 10 to 14 holes scattered over the entire pegmatite.

The Colorado Branch, Region IV, Bureau of Mines, in a period from late April to early July 1950, drilled 2 holes in the most favorable exposure of the New Anniversary-Rocky intermediate zone. The results were so unfavorable that drilling was discontinued after completing the second hole. It is estimated that 2,000 to 3,000 tons of this intermediate zone remain to be mined.

Extensive exploration by trenching not only is impractical but is almost impossible due to the cliff-like exposures. Dozens of vertical sections ranging from 5 to 50 feet high can be observed throughout most of the length and breadth of the dike.

It is concluded that the company should further develop the known surface exposures before attempting exploration or development at depth. If the surface exposures cannot be mined profitably, exploration at depth is not justified, as there is little evidence that more extensive or richer zones exist within shallow drilling range.

A direct subsidy, possibly as a price differential for the critical minerals, beryl and columbite, equivalent to the amount of the Government's participation in an exploration loan would, no doubt, result in more immediate production than any other method.

Denial of the application for exploration assistance is recommended.

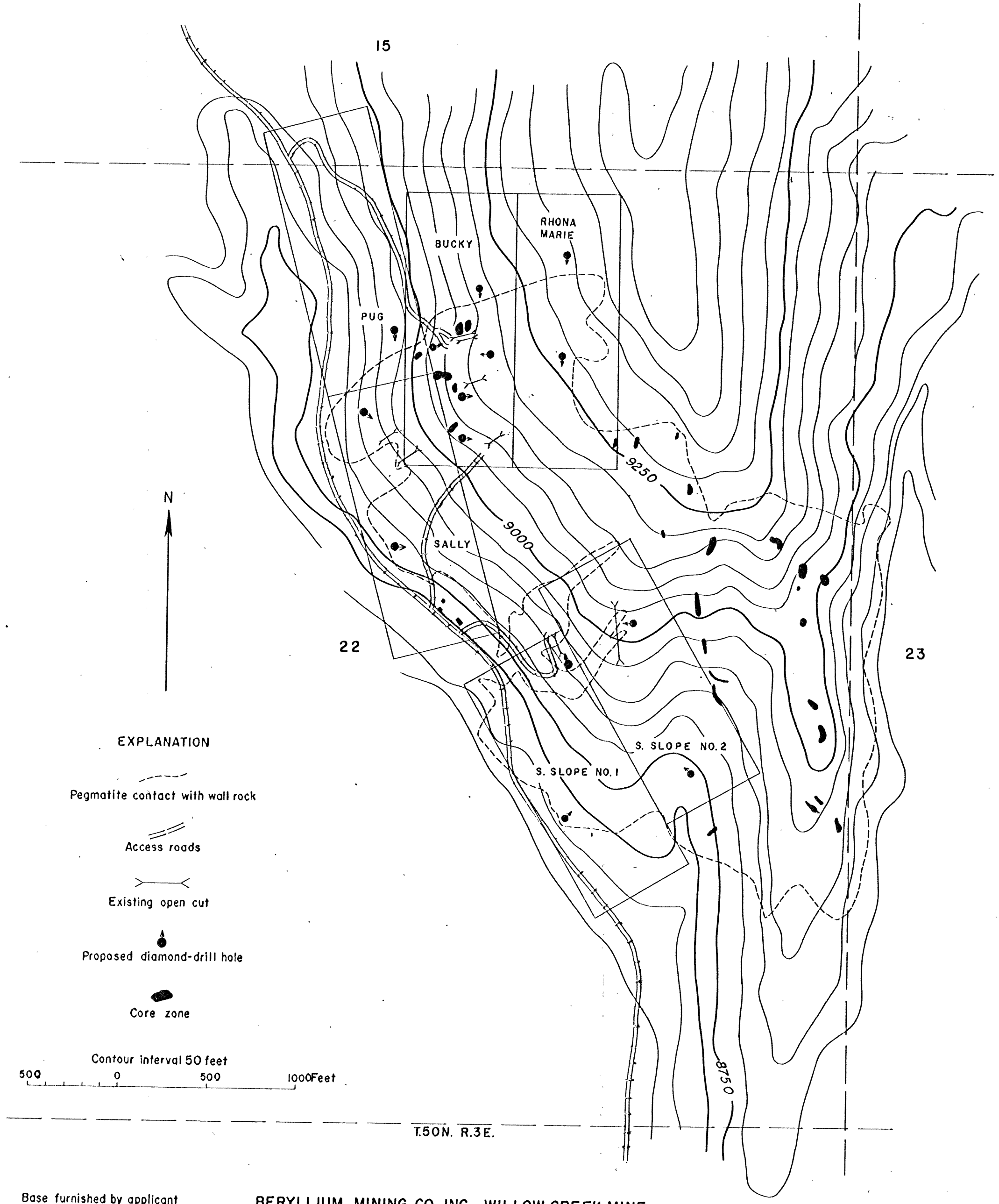
Russell R. McLellan
Russell R. McLellan
Mining Engineer

RRM/smh

cc 8

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

DMEA 2581



Base furnished by applicant
Modified after Staatz and Trites

BERYLLIUM MINING CO. INC., WILLOW CREEK MINE
GUNNISON COUNTY, COLORADO
FIG. 1

E.N. Harshman, August 1952