DMA Form 1

370

DEFENSE MINERALS ADMINISTRATION
Control Slip

CONTROLLED DOCUMENT

DMA Docket No. 1101X

DO NOT DETACH THIS SLIP

Action on this document is recorded and controlled in Reports and Records Branch. Any movement of this document between divisions or offices of DMA or movement outside DMA must be reported to the Reports and Records Branch. Actions taken that affect status of the case must also be reported.

This document has been recorded as

_____

Any action taken to change the type of request for assistance must be promptly reported to the Reports and Records Branch. Use DMA Form 2 for submitting these reports.

Routing Slip

To: ~~Mr. Lyon~~ Date ~~7-31~~

To: ~~Reports & Records~~ Date 8-1-5

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

DO NOT DETACH

CONTROLLED DOCUMENT

INT.-DUP. SEC., WASH., D.C. 98868

DIA-1[illegible] Exploration
Beryl, Mica
Region III

William A. Leinken & Robert C. Norton
Dawley Canyon Area, Ruby Mts., Elko Co., Nev.

Applicant requests 49,140. Investigation needed to reveal if there is any strategic Mica in evidence, any beryl which might be hand sorted. Question of need for road work to accomplish initial exploration. Explore possibility of initial prospecting by surface work only with simpler tools.

FILE COPY
SURNAME:

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

a.E.C. Barr

July 31, 1951

Code 370

[illegible]
252 [illegible]
[illegible], Nevada

[illegible]
[illegible]

Gentlemen:

[illegible] project [illegible] Silver-Gold [illegible], in [illegible] County, Nevada, [illegible], the [illegible].

[illegible] approval by the Defense Minerals Administration [illegible], [illegible], should [illegible] of [illegible] material of acceptable [illegible], physical characteristics and specifications, [illegible] quantities which will [illegible] material [illegible] position [illegible] national welfare.

[illegible] material, but [illegible] by [illegible], provide the following:

1. [illegible] detailed [illegible] deposit. [illegible] development.

2. [illegible] Engineer [illegible] [illegible].

[illegible]

Sincerely yours,

Tom Lyon

[illegible]

cc: Reports and Records Unit
Mr. Lyon
Mr. Barr
Field Examination III (2)
D.A. File

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

July 31, 1951 A. E. C.

Memorandum

To: Reports and Records Unit

From: Chief, Industrial Minerals Branch, DMA

Subject: DMA1101-X; Mica-Beryl
W. A. Reinken & R. C. Horton
Elko County, Nevada

Denial recommended because:

1) Previously accomplished work and detailed geologic mapping rather well indicates potentialities of deposit; need for and justification of additional exploration has not been shown.

2) Field Team examination and data resulting from previous U. S. Bureau of Mines studies indicates the deposit is likely to produce only minor amounts of strategic mica and beryl.

We are forwarding the entire docket which includes the following:

1. Report of Examination by Field Team
2. Preliminary Report by U.S. Bureau of Mines
3. War Minerals Memorandum
4. Memo from Field Team
5. Review of Application and attachment
6. Form MF 103 and attachments
7. Form MF 100 and attachments

James A. Barr

James A. Barr, Sr.

Approved:

Tom Lyon

Tom Lyon, Director
Supply Division

FILE COPY
SURNAME:

Barr

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

July 31, 1951
Code 370

Memorandum

To: Reports and Records Unit

From: Chief, Industrial Minerals Branch, [illegible]

Subject: [illegible]
[illegible] Norton
Elko County, Nevada

[illegible] recommendation:

1. [illegible] and detailed [illegible] indicates potential [illegible] of deposit; need for [illegible] additional exploration has not been shown.

2. [illegible]

We are forwarding the entire docket which includes the following:

1. Report of Examination by Field Team
2. Preliminary Report by U.S. Bureau of Mines
3. War Minerals Memorandum
4. Memo from Field Team
5. Review of Application and attachment
6. Form MF 103 and attachments
7. Form MF 100 and attachments

Memo

MW:mas

James Barr
James A. Barr, Sr.

cc: Reportsnand Records Unit
Mr. Lyon
Mr. Barr
DMA File

Approved:
Tom Lyon

Tom Lyon, Director
Supply Division

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

Office of
Executive Officer
DMA Field Team
Region III

1012 Flood Bldg.
870 Market St.
San Francisco 2, Calif.

July 20, 1951

Memorandum

To: Tom Lyon, Chairman, Coordinating Committee, DMA, Washington, D. C.

From: Executive Officer, DMA Field Team, Region III

Subject: Docket DMA-1101X--Beryl, Mica; William A. Reinken and Robert C. Horton

Reference is to your subject "Review of Application for Exploration Assistance."

Attached are four copies of a report,"DMA-1101X--Errington-Thiel Beryl, Mica Property, Elko County, Nev.," by John D. Warne, Mining Engineer, U. S. Bureau of Mines, dated July 17, 1951.

A field check by Mr. Warne relative to subject docket completes specific questions in the "Review" as follows:

1. The proposed exploration project is not considered worthwhile for Government participation. Field re-examination and review of previous work by the Bureau of Mines and Geological Survey rate the chances of such a project "none" or at best as "poor." (Question No. 4)

2. The applicant appears to have had adequate experience and sufficient educational background in mining and geology to properly conduct an exploration project. (Question no. 9.)

3. (a) The methods for conducting the project (if it were considered worth while) are not justified.

(b) No further information should be requested from applicant.

(c) Costs under exhibit A for an exploration program should have been approximately 25% of the amount estimated ($49,140); including only sampling from shallow surface trenches and test pits. (Question No. 10.)

4. (a) No road construction would be necessary to perform exploration work.

(b) No permanent bunk house or cook shack would have been necessary for a short-term sampling project. (Question No. 11.)

5. (a) Only a rented compressor, rock drill, and a truck with purchased hand tools and supplies would have been necessary to complete exploration.

(b) No mining equipment is owned by applicant.

(c) No rental of engineering instruments appear necessary. (Question No. 12.)

6. The schedule for proposed work and supervision costs are exceedingly high. About three men under one supervisor to expose the deposit and take samples would have been adequate. (Question No. 13.)

7. Due to shallow overburden and previous work, a fairly complete sampling program could be completed within 6 to 8 weeks' time.

8. (a) There is evidence of strategic mica; however, the chances for development and commercial production are remote (see conclusions Nos. 1-3 incl. in attached W.M.M., Nev. 60, October 1942).

(b) Occurrence of beryl in the dikes is exceedingly limited. (Question No. 17.)

In Item 17 of the "Review" the question is asked, "Any Beryl which might be hand-sorted?" Mr. E. H. Bailey, Geological Survey, noted that the supplemental report attached to the application states that all the Beryl is fine grain so that it evidently cannot be hand-sorted.

The docket and correspondence relating to it are returned herewith.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUL 24 1951
LAWSON F. STROBEL
Executive Secretary

H. C. Miller
Executive Officer, DMA Fielt Team,
Region III

Attachments

Copy to: E. H. Bailey, Geological Survey

UNITED STATES
DEPARTMENT OF THE INTERIOR
OSCAR L. CHAPMAN, SECRETARY

DEFENSE MINERALS ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

DMA-1101X - Errington-Thiel Beryl, mica Property

Elko County, Nev.

John D. Warne, Mining Engineer
U. S. Bureau of Mines

July 17, 1951

DOCKET DMA-1101X

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

ERRINGTON-THIEL BERYL, MICA MINE
Elko County, Nev.

SUMMARY

A Bureau of Mines engineer[1] re-examined the Errington-Thiel beryl, mica property on June 29, 1951.

The deposits are located in the Dawley Canyon Area, on the east flank of the Ruby Mountains, south central Elko County, Nev. (Fig. 1).

Examination was made pursuant to an application for loan to conduct an exploration project, Docket DMA-1101X. William A. Reinken and Robert C. Horton (lessees) are the applicants.

This report supplements and includes Preliminary Report by G. L. Thompson[2] and War Minerals Memorandum by W. T. Benson[2] covering previous examinations by the Bureau of Mines. A report and maps by E. N. Hinrichs[3] and others, submitted with the application, were also used in consideration of the proposed project.

Six samples were taken to determine the berrylia content of the deposits exposed in workings on the property.

1/ John D. Warne, Mining Engineer, Mining Division, Region III.
2/ Mining Engineers, Bureau of Mines, Reno, Nevada.
3/ Geologist, U. S. Geological Survey.

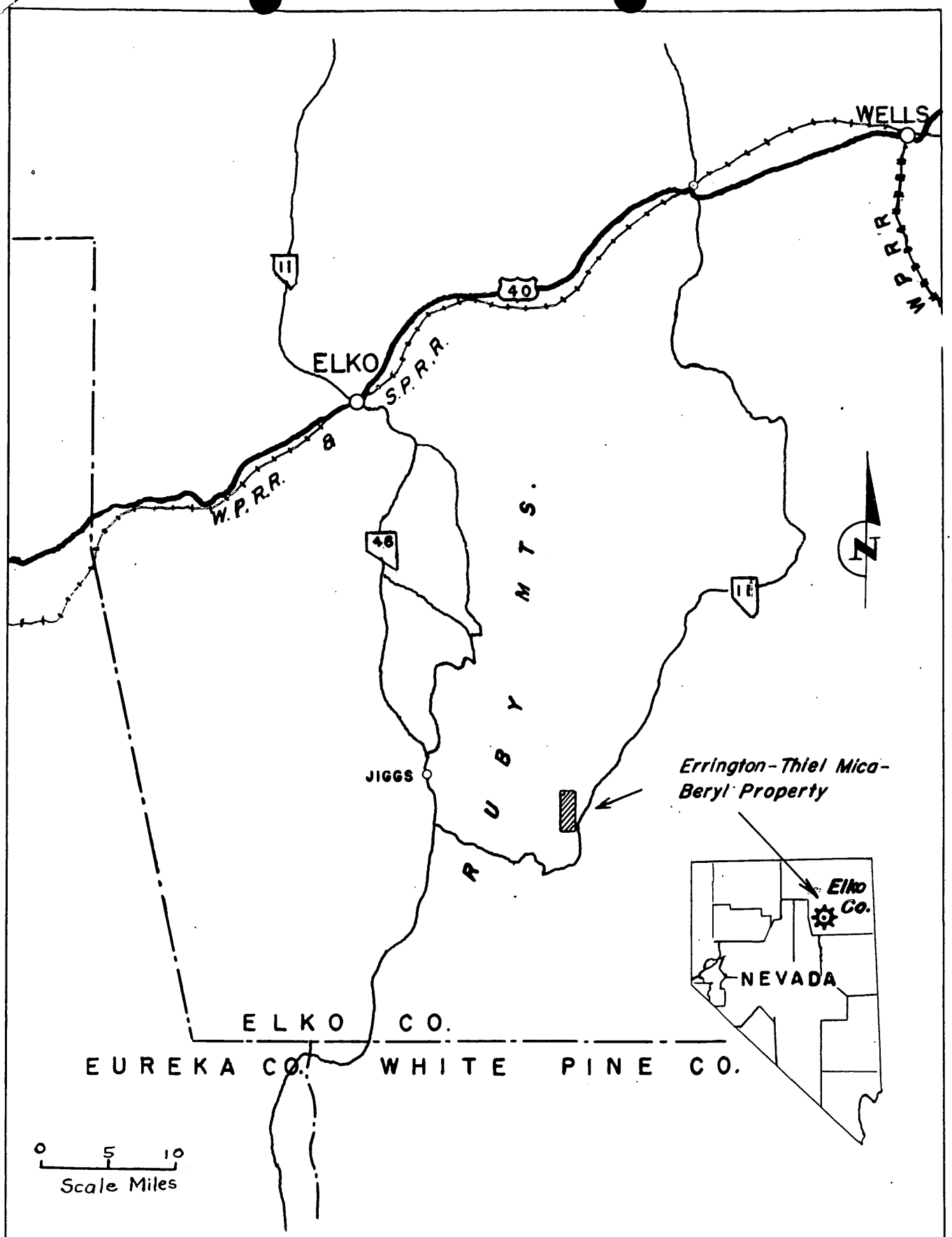


FIG. 1 LOCATION MAP ERRINGTON-THIEL PROPERTY

SAMPLING (Supplement)

Samples were taken from those pegmatites which have been exposed by previous work. More extensive sampling of the same deposits and of others could be accomplished by removing a shallow overburden.

The following samples (see fig. 2) indicate the beryllia content of the pegmatite deposits:

Sample No.	% BeO	Description
1	0.00	Horizontal channel sample across face of mica-beryl adit, Mica-beryl Nos. 304 claims, 5 ft. length.
2	0.00	Bulk grab sample from muck pile at face of Mica-Beryl adit.
3	0.00	Bulk grab sample from muck pile, 15 feet from face of Mica-Beryl adit.
4	0.03	Channel sample across portion of pegmatite deposit which appears to contain beryl, 1.4' length, taken 40 feet from portal of Mica-Beryl adit.
5	0.00	Specimen sample of pegmatite material from prospect hole, Mica-Beryl No. 4 claim.
6	0.00	Channel sample of pegmatite material exposed in prospect hole on N. side of Dawley Creek.

No mica of sufficient size or quality to be of a commercial grade appeared to be contained in the deposits which were sampled. No samples on specimens of this commodity were taken. However, an appraisal by Oliver Boyles[4/] of mica samples taken from a cut in a 12-foot dike on the property is contained in the Preliminary Report attached.

METALLURGICAL TESTS

Work done on the beneficiation of a small sample of beryl ore containing 2.97% BeO by which a concentrate of 7.89% BeO was supplied by

4/ Chief, Nonmetal Economic Division, Bureau of Mines, Washington, D.C.

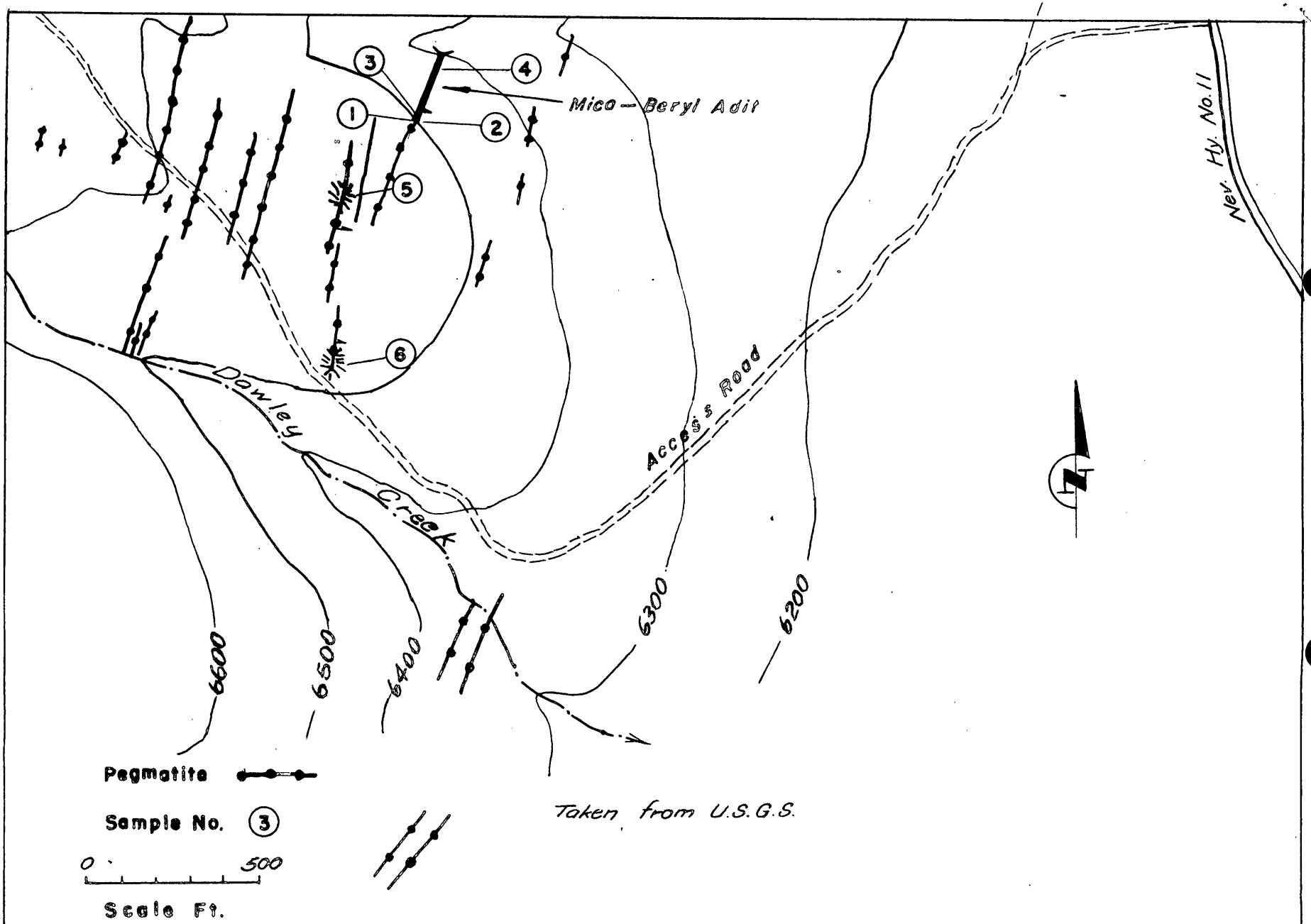


FIG. 2 SAMPLE MAP — ERRINGTON-THIEL MICA, BERYL PROPERTY — ELKO CO., NEVADA

the applicant. These data are attached. Other metallurgical tests previously performed on beryl ores from the same district by the Bureau of Mines[5] were presented with the application.

CONCLUSIONS

1. Development heretofore done has not been sufficient to indicate the grade of beryl and mica in all of the pegmatite occurrences on the property.

2. The analysis of samples taken by the Bureau of Mines from some of the pegmatite deposits indicate that no commercial grade of beryl ore exists.

3. Samples previously appraised by Oliver Boyles indicate that the deposits have little merit as a possible producer of either strategic or commercial grades of mica.

4. Inaccessibility of the property, its distance from the market, and the doubtful success of concentrating low grade beryl or processing the mica, are serious handicaps to possible production of even the grades of ore which otherwise might have a market value.

RECOMMENDATIONS

1. No participation by the Government in further exploration of this property is recommended.

2. Factual information gained through examinations of the property should be imparted to the present lessees to preclude further work on the deposits now believed to be unworthy of further development, and to encourage exploration by him of new deposits.

5/ Report of Investigations 4166 - "Flotation of Beryllium Ores" by J. S. Kennedy and R. G. O'Meara, January 1948, p. 14.

C O P Y

May 29, 1951.

YL - 656

FLOTATION OF BERYL ORE

FROM UNITED ENGINEERS OF RENO NEVADA

SAMPLES:

Pegmatite material containing feldspar, mica, quartz, and beryl. Total weight 8½ Lbs. and ranging in size from 1" to fines.

Calculated assay (from test products) 2.97% BeO.

GENERAL CONSIDERATIONS:

The quantity of sample was only sufficient for one flotation test. The grinding and flotation proceedure recommended by the Bureau of Mines in the Report of Investigations No. 4166, January 1948, was followed.

CONCLUSION:

No. 1 The Beryl in this ore can be concentrated by flotation. A Beryl concentrate was produced which assayed 7.69% BeO and contained 64.98% of the total BeO. Further test work would be required to improve the grade of the concentrate and the recovery of BeO.

No. 2 The grade of the concentrate could probably be improved by a preliminary rougher float to remove mica.

No. 3 The recovery could probably be improved by varying the grinding and sizing to reduce the quantity of slimes.

The slimes in this test represented; 53.44 Weigh %; 2.59% BeO Assay; 32.00% BeO Distribution.

R. G. Jones

MAY 31, 1951. TL - 656 FLOTATION OF BERYL ORE FROM UNITED ENGINEERING, 282 W. 1st. St., RENO, NEVADA

No.	Product	Weight		Assay (%)	Content (gms)	Distribution (%)
		Gms.	%	BeO	BeO	BeO
	Head Assay (Calc)		100.00	2.97		100.00
	+10 Mesh Mica		5.56	3.56		6.68
	-10 Mesh Ore		94.44	2.93		93.32
	Calc. -10 Mesh Ore	2,177	100.00	2.71	58.94	100.00
	+65 & +100 Mica	97	4.46	0.60	0.58	0.98
	Decanted Slimes	728	33.44	2.59	18.86	32.00
	Flot. Conc.	498	22.88	7.69	38.30	64.98
	Flot. Mids	76	3.49	0.36	0.27	0.46
	Flot. Tails	778	35.74	0.12	0.95	1.58

PROCEDURE: Sample as received consisted of approximately 2.5 kgs. of coarse pieces of mica, quartz, feldspar, and beryl ore, some about +2 inch mesh with large plates of mica imbedded in same. Roll crushed -10 mesh. After several passes thru rolls, +10 mesh appeared to be all mica which was not amenable to further roll crushing. Reserved for separate assay as shown above, -10 mesh product used for flotation test. Following Bureau of Mines Report R.I. 4166 proceeded as follows: Stage ground wet in Lab. ball mill, screening on 65 mesh until +65 appeared to be all mica. -65 now screened on 100 mesh. +100 stage ground -100 until +100 appeared to be all mica. Combined +65 and +100 mica for assay. De-slimed -100 ore thoroughly by settling and decanting. Slime screened on 200 mesh since quantity of same appeared to be quite high. +200 re-deslimed and added to balance of deslimed ore. Slime thickened, filtered, and dried.

Conditioning for Flotation: 9.2 Lbs/Ton HF (48%) added to ore pulp of about 50% solids and agitated 30 minutes. Ph 2.0 - 2.5. Settled, decanted, and washed 5 times before ph same as tap water, ph 5.0

Flotation: Conditioned washed pulp placed in 2,000 gm. Denver Lab. flotation cell.
Added: 0.62 Lbs/Ton Na_2CO_3
8.0 Lbs/Ton Oleic Acid
0.16 Lbs/Ton B-24 alcohol ph 6.8

Froth heavy with much mica. Flotation time 3-4 minutes.
Rougher Conc. cleaned in 500 gm. Denver Lab. flotation cell, added 1.7 Lbs/Ton Na_2CO_3 ph 7.5
Froth heavy and thick with mica. Cleaning time 2-3 minutes
BeO determined by gravimetric method following analytical procedure outlined by Deguzan Gutleutstrasse.

BUREAU OF MINES REPORT R.I. 4166 TABLE 17 - FLOTATION OF BERYL FROM R.O. HUDDLESTON PROP. RUBY MTS. NEVADA.

No.	Product	Weight		Assay (%)	Content (gms)	Distribution (%)
		Gms.	%	BeO	BeO	BeO
	Calc. Heads		100.00	1.09		100.00
	Beryl Conc.		8.30	11.10		84.4
	Middling		14.82	0.08		1.1
	Tailing		16.20	0.04		2.2
	Slime		13.03	0.75		8.9
	Mica		3.65	1.01		3.4

The ore contained 1.03% beryllia and was mainly albite, orthoclase, and microclinic feldspars, and quartz, with appreciable beryl and muscovite and small amounts of hematite, apatite, spessartite and Zircon. Irom and manganese oxide stainings also were present in small amounts.

Above is a flotation metallurgical balance, showing degree of concentration that can be attained as compared with TL - 556, United Engineering Beryl flotation, both ores being approximately of the same type, although United Engineering beryl ore seemed to contain more mica than above.

August 1947

PRELIMINARY REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

ERRINGTON - THIEL
Elko County, Nevada

By W. T. Benson[1]

- Mica, Beryl -

SUMMARY

The Errington - Thiel mica-beryl deposits are on the east flank of the Ruby Mountain, south central Elko County, Nevada, about 66 miles southeast of Elko, the supply and shipping point on the Southern and Western Pacific Railroads.

The mica and beryl bearing pegmatites were first located in 1931. They were opened and operated in a small way about three years ago. Resulting from the operation about 250 pounds of sheet mica was produced. There has been no production of beryl. Following the shut down in January 1945, all surface and mining equipment was removed from the property. Except for assessment purpose, no work has been done on the property in recent years.

Rocks in the area comprise Paleozoic sediments which have been intruded by Tertiary granite. In areas of considerable size, the sediments have been altered to mica schist which contacts the granites irregularly.

1/ Mining Engineer, Reno Division, Mining Branch, Bureau of Mines, U. S. Department of the Interior.

The mica and beryl deposits occur in pegmatite dikes and stringers which are enclosed in steeply dipping quartz-mica schist. In thickness, the dikes vary from 4 to 45 feet with lengths as much as 300 feet. In general, the dikes are concordant with the schists and are comprised of quartz and albite with subordinate microcline and muscovite mica. Accessory minerals are beryl and garnet.

The beryl present in the deposits open to inspection is too low for commercial operation, but exploration has not been sufficient to indicate satisfactorily the possible grade of the beryl in the deposits.

The mica that has been developed is of the clear variety; free of blemishes or checks, which occurs in two nearly parallel pegmatite dikes. In these areas, it would be practically impossible to accurately judge the amount of mica that eventually may be produced. In the sections opened, the percentage of mica may approximate 15 percent of the material exposed. Of this amount, possibly a few percent of the total recoverable mica might be sorted out as punch and larger book sizes.

As developed the beryl present is too low for commercial operation. The mica showings are adequate for a small operation and should the supply of mica again become critical, this deposit could be considered a source for punch and larger book sizes.

Further consideration of the property by the Bureau of Mines is not recommended at this time.

INTRODUCTION

The Errington - Thiel mica and beryl property was examined by an engineer[2] of the Bureau of Mines, August 12, 1947 accompanied by Oscar W. Thiel and Alma T. Errington, owners, Ruby Valley, Nevada.

Previously the property was examined by J. H. Wiese and M. R. Clepper and later by D. J. Fisher, geologists of the Federal Geological Survey. The property was also visited by an engineer[3] of the Bureau of Mines in October 1942 but no report was submitted relative to this examination.

Property holdings comprise 55 unpatented lode mining claims situated on the east flank of the Ruby Range sec. 16, 17, 20, 21, 28, and 29, T. 29 N., R. 58 E., Elko County, Nevada, about 65 miles southeast of Elko, the supply and shipping point on the Western and Southern Pacific Railroads. To reach the property from Elko, Highway 46 is followed south 40 miles to the Harrison Pass turnoff. The Harrison Pass road and the Ruby Valley roads are then traveled east and north to the property, a distance of 25 miles.

HISTORY

Locations were first made on the property in 1931, by M. W. Young, who in 1936 interested Mrs. Alma T. Errington on a partnership basis. Only enough work was done on the property by Mr. Young and Mrs. Errington to secure the claims. A lease was granted to the Downer Bros. in 1943. Little work was done by the lessee and the property was returned to the owners in the spring of 1944. In September 1944 a lease was granted to Vernon Farnam and Fred Story

2/ W. T. Benson
3/ Glenn L. Thompson

of Oakland, California. The lessees rehabilitated the old camp and surface tram was reconditioned. In Elko a building on Commercial Street was secured in which tables with testing lights and cutting equipment for 12 operatives was installed. Resulting from this operation approximately 250 pounds of small size sheet mica was shipped to the Colonial Mica Co., who had a representative in Moscow, Idaho. The venture apparently was not profitable and in January 1948 the lease was forfeited and the property reverted back to the owners. Mr. Young is no longer associated with the property and it is now controlled by Mrs. Errington and her brother Oscar R. Thiel. No work has been done on the property in recent years.

PHYSICAL FEATURES

The claims are located on the east flank of the Ruby Range in an area of steep and rugged topography at an altitude of 6,500 to 9,000 feet. The topography is characterized by eastward trending, sharp ridges separated by steep walled canyons.

Climate in the area is temperate with moderately cool summers and long severe winters. Precipitation occurs usually as snow with occasional rains during the fall and spring months. Usually the area is inaccessible because of heavy snows during the period November 15 to May 1. An ample supply of water in Tipton and Lawley Creeks supply water for domestic and mining needs.

Vegetation in the area comprises sage brush and aspen in the canyon bottoms with mountain mohogany, juniper, and fir and pine at the higher altitudes.

The nearest shipping point is Tebar, about 50 miles by well graded road east on the Western Pacific Railroad.

No transmitted electric power is available, and for generation of power, fuel oil was supplied in drums by truck from Elko, 65 miles north.

HOUSING FACILITIES

Aside from the small residence of Mrs. Arrington, there are no housing facilities on the property for the accommodation of a crew.

EQUIPMENT

Mining equipment used by lessees has been removed from the property.

GEOLOGY AND DESCRIPTION OF THE DEPOSIT

Rocks in the area comprise Paleozoic sediments which have been intruded by Tertiary granite.

In areas of considerable size, the sediments have been altered to mica schist. Where exposed, the schist is medium grained with a well defined schistose structure that strikes N. 10° to 20° W. and dips 60° to 70° east. The schist contacts the granite irregularly. Tongues of granite extend into the main schist areas and large inclusions of schist, as float blocks, occur in the granite. The granite is of uniform texture except in areas where it is cut by pegmatite dikes.

The mica and beryllium deposits occur in pegmatite dikes and stringers which are enclosed in steeply dipping quartz-mica schist that contains local gray wacke or impure quartzite phases adjacent to the margin of the body of granite.

In the area examined, there are numerous dikes which vary from a few feet to 45 or more feet in thickness with lengths of as much as

500 feet. In general, the dikes are concordant with the schists.

The dikes consist essentially of quartz and albite with subordinate microcline and muscovite mica. Accessory minerals are beryl and garnet.

From development workings open to inspection, the amount of beryl present is too low for commercial operation, but exploration has not been sufficient to indicate satisfactorily the grade of beryl in the deposits.

The mica that has been developed occurs in two parallel dikes near the crest and on the south side of an eastward trending ridge. As exposed, the dikes strike N. 10° E. and dip 60° E. and vary in thickness from 6 to 10 feet. In them the mica occurs in stringers and as small bunches. In the bunches, book mica is present from which sheets 3 to 6 inches square could be obtained. The bunches appear to be better developed near the margin of the dikes. The mica content in the areas exposed varies from 10 to 20 percent. It is of the muscovite variety, which in thin sheets, is clear and comparatively free of blemishes or checks.

DEVELOPMENT

Development openings in the beryl section comprise a few surface cuts and an adit, all of which are now caved. In the mica area development consists of a 30 foot adit which is connected to a surface cut by a 20 foot raise. The best mica showing is exposed in surface pit 10 feet wide, 15 feet long, and excavated to a depth of 12 feet.

ORE RESERVES

Sufficient work has not been done in the areas containing beryl to permit making a satisfactory estimate of reserve tonnages.

The mica bearing dikes in the area explored are traceable on surface for possibly 500 feet. In these areas, it would be practically impossible to accurately judge the amount of mica that eventually may be produced. In the sections opened, the percentage of mica in the dike may approximate 15 percent of the material exposed. Of this amount, possibly a few percent of the total recoverable mica might be sorted out as punch and larger book sizes.

In sorted small piles on the dumps there is possibly 700 to 1,000 pounds of mica that is suitable for punch sizes.

SAMPLING

No attempt was made to sample exposed faces for mica. Representative small books and punch size material however, were obtained from the better showing in the open pit for comparison and observational purposes.

PLAN OF OPERATION

Except for work necessary to secure title to the claims, no large scale development of the deposits is contemplated by the owners at the present time.

CONCLUSIONS

From an inspection of development openings, it is apparent the amount of beryl present is too low for commerical operation, but exploration has not been sufficient to indicate satisfactorily the grade of beryl in the deposits.

Mica showings are adequate for a small operation, and from showings elsewhere on the property, it is possible additional mica bearing areas could be developed.

In the sections open to inspection, the percentage of mica in the dikes may approximate 15 percent. Of this amount, possibly a few percent of the total recoverable mica might be sorted out as punch and larger book sizes.

Sufficient mica as punch and larger book sizes is exposed so that the deposit could be classed as a source should the supply of mica again become critical.

Further consideration of the property by the Bureau of Mines is not recommended at this time.

W.M.M.
Nev-60
October 1942

WAR MINERALS MEMORANDUM[1]

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

Report of the Bureau of Mines to Hon. Harold L. Ickes,
Secretary of the Interior

ERRINGTON MICA-BERYL PROPERTY
Nike County, Nevada

-Mica-Beryl-

Summary

The Errington mica-beryl property has had little development and no production. The character and quality of the muscovite block mica so far exposed is for the most part nonstrategic and noncommercial. The property's isolation from markets is a serious handicap.

An apparently large tonnage of mica schist, occurring in the walls of the largest of the pegmatite dikes, is not suitable for marketing as ground mica.

The beryl content of the pegmatite is too small to justify any attempt at further development.

No further consideration by the Bureau is recommended.

1/ These memoranda present the facts reported by Bureau of Mines engineers regarding properties for which no further consideration is recommended. Therefore, they should be treated as confidential, for the sole use of Bureau employees. They should not be given out to the public or to the owners of the properties concerned.

Introduction

Errington's mica-beryl property in the Ruby Range, Elko County, Nevada, was examined in October 1942 by an engineer of the Bureau of Mines. This property is about 65 miles southwesterly from Wells, Nevada. The route from Wells is by U. S. Highway No. 93, 25 miles south to Warm Creek Ranch, thence by Ruby Valley graveled road southwest 40 miles to the property.

History

The Errington property includes 55 claims owned by Mrs. A. T. Errington and five claims owned by Elizabeth Shaffer. The five Shaffer claims and six of the Errington group were acquired from H. R. Castle of Elko. M. W. Young also is said to own an interest in the Errington claims. Excepting those obtained from H. R. Castle, all were located in 1941.

Physical Features

The Ruby Range is a rugged, granitic chain of mountains, some of which rise to elevations above 10,000 feet. The Errington property lies on the east slope of the Range, and varies in elevation from 6000 to approximately 9000 feet.

Description of the Deposit

Numerous pegmatite dikes occur in granite, striking N. to N. 15 W. The dikes vary in width from 2 to 12 feet or more. Dike minerals are quartz, felspar, block muscovite mica, garnet, magnetite, and a very small amount of beryl. An occasional copper stain was noted. Numerous open cuts have been made on the various dikes. The largest of these, and the most westerly of the number examined, was 12 feet in

width with a vertical face about 10 feet high, exposing block muscovite mica irregularly spaced, and small areas consisting principally of garnet and magnetite, in a gangue of quartz and felspar. About 40 tons of the mica has been removed from this cut and is now stored on the adjacent dump.

The mica crystals in the large cut are as much as 4 by 5 inches, edge dimensions. Some are broken and cracked by the toppling of the dike at the surface, caused by erosion of its walls. The mica shows some cross-grains, hairline and tangle-sheet defects, and some black-spotted-stain was noted. About five percent of the mined mica on the dump of the cut is relatively clear, only slightly smoky, and possibly of commercial value. No other cut on the property shows block mica.

The muscovite mica is of more potential strategic value than the beryl. The dike in which this cut was excavated extrudes through mica schist. The schist apparently extended for at least 20 to 30 feet from the walls of the dike, but its definite extent was obscured by overburden.

The occurrence of beryl in these dikes appears to be exceedingly limited. In a close examination of the faces of ten or twelve cuts in various dikes, the Bureau's engineer obtained only a handful of small beryl crystals. A hand-specimen of the beryl sent to the Salt Lake laboratory was reported by Dr. R. L. Head to be "a good grade of beryl". The property has produced a total of only a few hundred pounds of this mineral, according to statements by the owner and others.

The beryl crystals vary in color from nearly white to light green. Their occurrence in the dikes is so infrequent that it is believed no reasonable ratio of concentration by milling is possible. Perhaps 500 tons or more of dike rock would have to be mined and treated to obtain one ton of beryl.

Sampling

Three samples of mica were taken from the cut in the 12-foot dike and were sent to Oliver Bowles, Chief, Nonmetal Economics Division of the Bureau in Washington, for his appraisal. One sample was taken of the mica schist in the walls of the large dike. His report is:

Sample A. In crude form approximately 20 square inches. Water colored, edges badly cross-grained, slight ruling, slight clay stained, incipient "A" ruling, rather gummy throughout. Utilizable area three square inches for punch, but not economical even at present prices, difficult to split, most suitable for grinding, nonstrategic. Its price range would be from $7.50 to $21.00 per short ton.

Sample B. In crude form about 10 square inches, light rum color, slight ruling, utilizable area (after trimming edges) four square inches. Some hair-lines in the sound area, soft, suitable for punch of No. 2 clear quality, strategic, which commands a price of at least 30 cents per pound, half trimmed, North Carolina method of preparation.

Sample D. Mica schist, (from walls of large dike) muscovite with minor amounts of biotite, by grinding and beneficiation could possibly produce a low value roofing mica, although the biotite content may rule this out. Probably noncommercial.

Sample E. Suitable for grinding although most of the muscovite has been altered to chlorite and would not command the top price. Price range in western United States for similar material, $1.50 to $9.50 per ton, provided market exists within economic transportation range.

Mr. Bowles comments: "Sample B. is the only strategic quality of the lot. Although the crude book was about 10 square inches and after trimming was four square inches, the yield would not be 40 percent but more like five percent, due to large amount of mica skimmings that must be discarded in splitting off to the sound laminae."

No samples were taken of the dikes containing beryl. No more than a few small crystals of beryl were seen in place anywhere on the property.

Conclusions

It is concluded that:

1. Based upon the appraisal of samples by Oliver Bowles, the deposit has little merit as a possible producer of either strategic or commercial grades of mica.

2. Development heretofore done has exposed block mica only in one cut at the surface.

3. Relative inaccessibility of the property, its distance from market, and the extreme inexperience of the owners now attempting to exploit it, are severe handicaps to possible production of even the grades which otherwise might have a market value.

4. Beryl content of the dike material is too small to be mined at a profit. Even if war requirements demanded production of beryl without regard to cost, this property would be unattractive for the reason that as now developed, only limited production could be expected.

No development of this property by the Bureau is recommended.

UNITED STATES
DEPARTMENT OF THE INTERIOR
OSCAR L. CHAPMAN, SECRETARY

DEFENSE MINERALS ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

DMA-1101X - Errington-Thiel Beryl, mica Property

Elko County, Nev.

John D. Warne, Mining Engineer
U. S. Bureau of Mines

July 17, 1951

Reinken, William
& Robert J. Horton

DOCKET DMA-1101X

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

ERRINGTON-THIEL BERYL, MICA MINE
Elko County, Nev.

SUMMARY

A Bureau of Mines engineer[1] re-examined the Errington-Thiel beryl, mica property on June 29, 1951.

The deposits are located in the Dawley Canyon Area, on the east flank of the Ruby Mountains, south central Elko County, Nev. (Fig. 1).

Examination was made pursuant to an application for lease to conduct an exploration project, Docket DMA-1101X. William A. Reinken and Robert C. Norton (lessees) are the applicants.

This report supplements and includes Preliminary Report by G. L. Thompson[2] and War Minerals Memorandum by W. T. Benson[3] covering previous examinations by the Bureau of Mines. A report and maps by E. N. Hinrichs[3] and others, submitted with the application, were also used in consideration of the proposed project.

Six samples were taken to determine the berrylia content of the deposits exposed in workings on the property.

1/ John D. Warne, Mining Engineer, Mining Division, Region III.
2/ Mining Engineers, Bureau of Mines, Reno, Nevada.
3/ Geologist, U. S. Geological Survey.

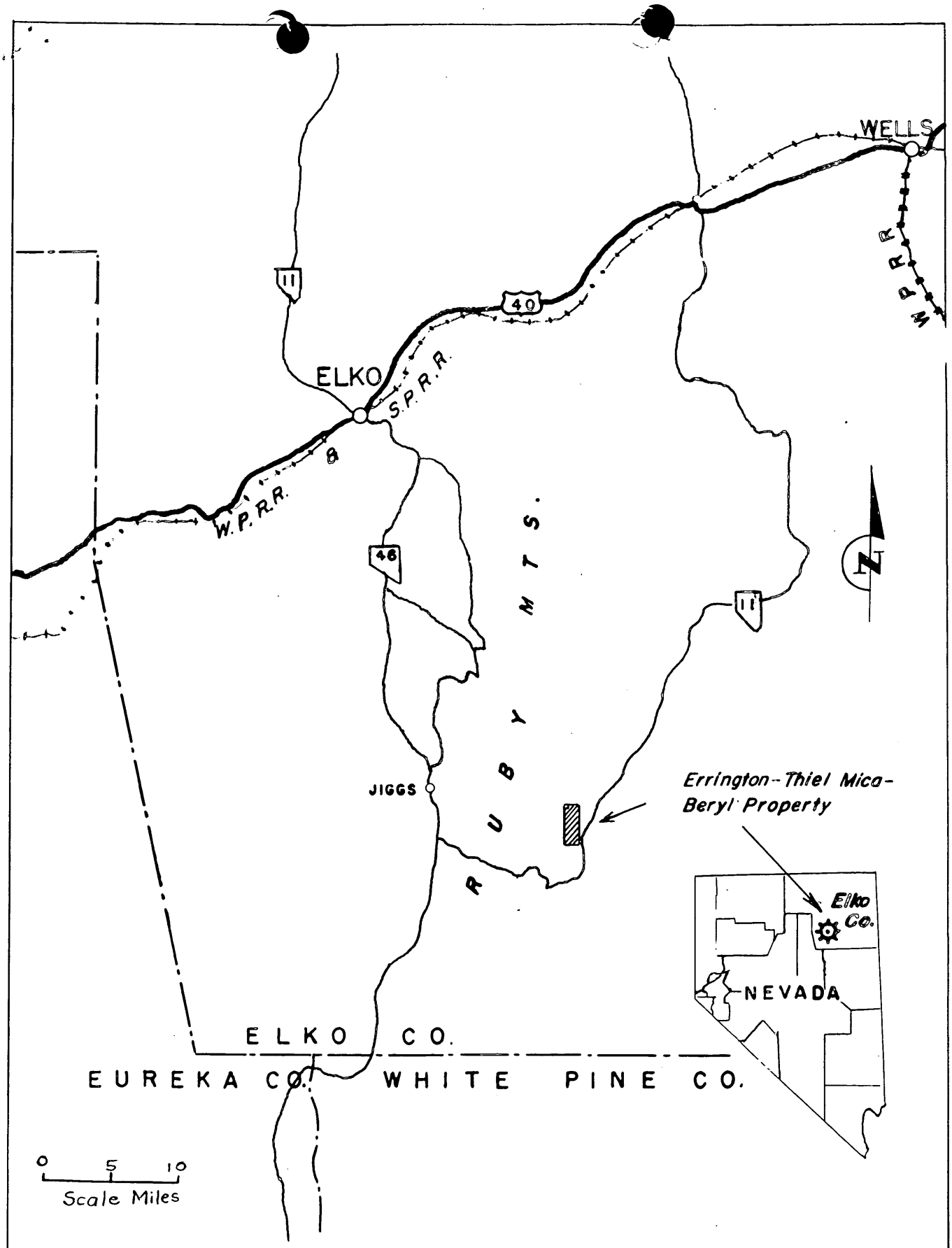


FIG. 1 LOCATION MAP ERRINGTON-THIEL PROPERTY

SAMPLING (Supplement)

Samples were taken from those pegmatites which have been exposed by previous work. More extensive sampling of the same deposits and of others could be accomplished by removing a shallow overburden.

The following samples (see fig. 2) indicate the beryllia content of the pegmatite deposits:

Sample No.	% BeO	Description
1	0.00	Horizontal channel sample across face of mica-beryl adit, Mica-beryl Nos. 384 claims, 5 ft. length.
2	0.00	Bulk grab sample from muck pile at face of Mica-Beryl adit.
3	0.00	Bulk grab sample from muck pile, 15 feet from face of Mica-Beryl adit.
4	0.05	Channel sample across portion of pegmatite deposit which appears to contain beryl, 1.4' length, taken 40 feet from portal of Mica-Beryl adit.
5	0.00	Specimen sample of pegmatite material from prospect hole, Mica-Beryl No. 4 claim.
6	0.00	Channel sample of pegmatite material exposed in prospect hole on N. side of Dawley Creek.

No mica of sufficient size or quality to be of a commercial grade appeared to be contained in the deposits which were sampled. No samples on specimens of this commodity were taken. However, an appraisal by Oliver Boyles[4/] of mica samples taken from a cut in a 18-foot dike on the property is contained in the Preliminary Report attached.

METALLURGICAL TESTS

Work done on the beneficiation of a small sample of beryl ore containing 2.97% BeO by which a concentrate of 7.69% BeO was supplied by

4/ Chief, Nonmetal Economic Division, Bureau of Mines, Washington, D.C.

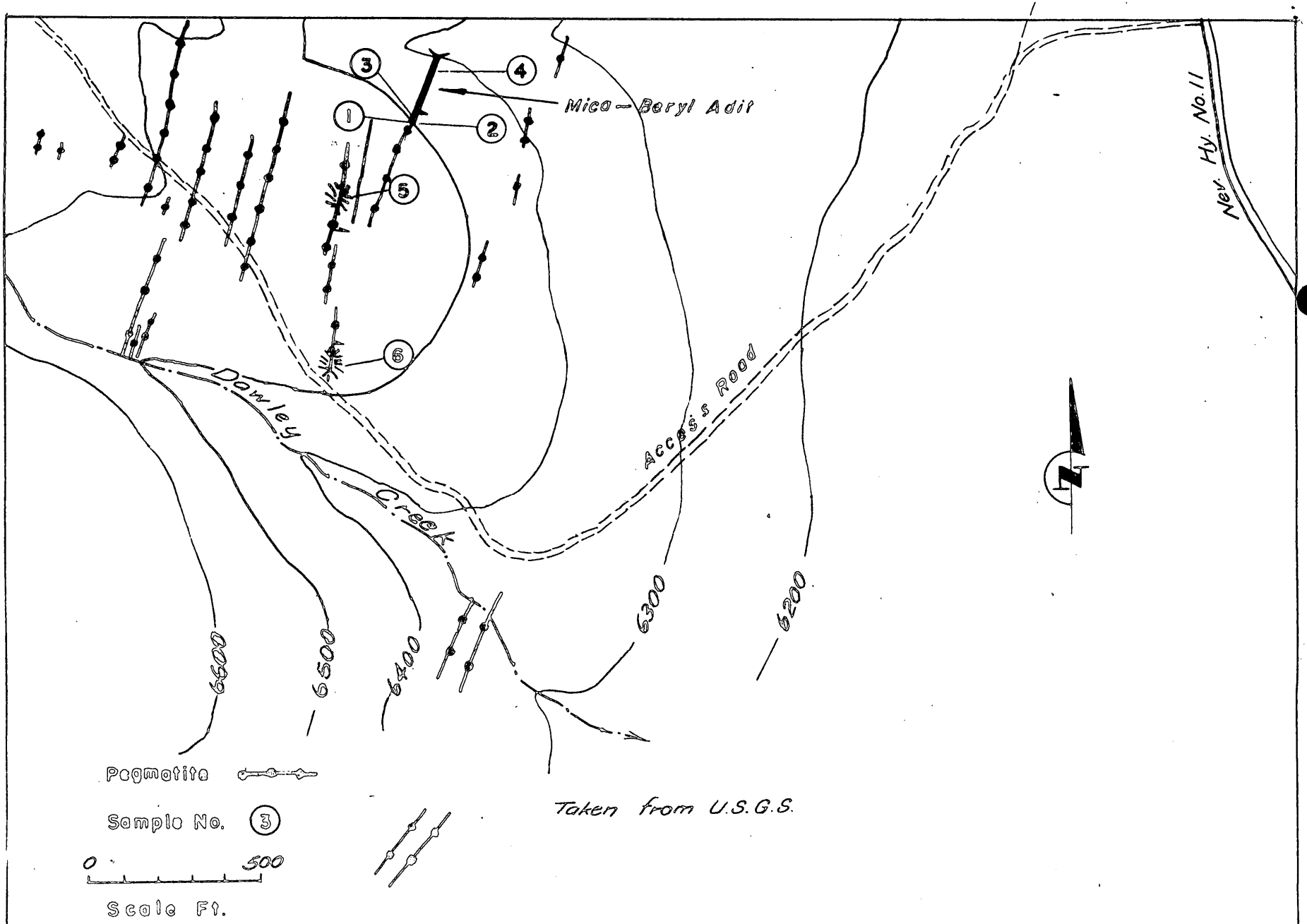


FIG. 2 SAMPLE MAP — ERRINGTON-THIEL MICA, BERYL PROPERTY — ELKO CO., NEVADA

the applicant. These data are attached. Other metallurgical tests previously performed on beryl ores from the same district by the Bureau of Mines[5] were presented with the application.

CONCLUSIONS

1. Development heretofore done has not been sufficient to indicate the grade of beryl and mica in all of the pegmatite occurrences on the property.

2. The analysis of samples taken by the Bureau of Mines from some of the pegmatite deposits indicate that no commercial grade of beryl ore exists.

3. Samples previously appraised by Oliver Boyles indicate that the deposits have little merit as a possible producer of either strategic or commercial grades of mica.

4. Inaccessibility of the property, its distance from the market, and the doubtful success of concentrating low grade beryl or processing the mica, are serious handicaps to possible production of even the grades of ore which otherwise might have a market value.

RECOMMENDATIONS

1. No participation by the Government in further exploration of this property is recommended.

2. Factual information gained through examinations of the property should be imparted to the present lessees to preclude further work on the deposits now believed to be unworthy of further development, and to encourage exploration by him of new deposits.

5/ Report of Investigations 4166 - "Flotation of Beryllium Ores" by J. S. Kennedy and R. G. O'Meara, January 1948, p. 14.

COPY

May 29, 1951.

TL - 656

FLOTATION OF BERYL ORE

FROM UNITED ENGINEERS OF RENO NEVADA

SAMPLES:

Pegmatite material containing feldspar, mica, quartz, and beryl. Total weight 5½ Lbs. and ranging in size from 1" to fines.

Calculated assay (from test products) 2.97% BeO.

GENERAL CONSIDERATIONS:

The quantity of sample was only sufficient for one flotation test. The grinding and flotation procedure recommended by the Bureau of Mines in the Report of Investigations No. 4166, January 1948, was followed.

CONCLUSION:

No. 1 The Beryl in this ore can be concentrated by flotation. A Beryl concentrate was produced which assayed 7.69% BeO and contained 84.98% of the total BeO. Further test work would be required to improve the grade of the concentrate and the recovery of BeO.

No. 2 The grade of the concentrate could probably be improved by a preliminary rougher float to remove mica.

No. 3 The recovery could probably be improved by varying the grinding and sizing to reduce the quantity of slimes.

The slimes in this test represented; 35.44 Weigh %; 2.59% BeO Assay; 32.00% BeO Distribution.

R. G. Jones

MAY 31, 1961. TL - 656 FLOTATION OF BERYL ORE FROM UNITED ENGINEERING, 252 W. 1st. St., RENO, NEVADA

No.	Product	Weight		Assay (%)	Content (gms)	Distribution (%)
		Gms.	%	BeO	BeO	BeO
	Head Assay (Calc		100.00	2.97		100.00
	+10 Mesh Mica		5.56	3.56		6.48
	-10 Mesh Ore		94.44	2.93		93.52
	Calc. -10 Mesh Ore	2,177	100.00	2.71	58.94	100.00
	+65 & +100 Mica	97	4.46	0.60	0.58	0.98
	Decanted Slimes	728	33.46	2.59	18.86	32.00
	Flot. Conc.	498	22.88	7.69	38.30	64.98
	Flot. Mids	76	3.49	0.36	0.27	0.46
	Flot. Tails	778	35.74	0.12	0.93	1.58

PROCEDURE: Sample as received consisted of approximately 2.5 kgs. of coarse pieces of mica, quartz, feldspar, and beryl ore, some about +2 inch mesh with large plates of mica imbedded in same. Roll crushed -10 mesh. After several passes thru rolls, +10 mesh appeared to be all mica which was not amenable to further roll crushing. Reserved for separate assay as shown above. -10 mesh product used for flotation test. Following Bureau of Mines Report R.I. 4163 proceeded as follows: Stage ground wet in Lab. ball mill, screening on 65 mesh until +65 appeared to be all mica. -65 now screened on 100 mesh. +100 stage ground -100 until +100 appeared to be all mica. Combined +65 and +100 mica for assay. De-slimed -100 ore thoroughly by settling and decanting. Slime screened on 200 mesh since quantity of same appeared to be quite high. +200 re-deslimed and added to balance of deslimed ore. Slime thickened, filtered, and dried.

Conditioning for Flotation: 9.2 Lbs/Ton HF (48%) added to ore pulp of about 50% solids and agitated 30 minutes. Ph 2.0 - 2.5. Settled, decanted, and washed 5 times before ph same as tap water, ph 5.0

Flotation: Conditioned washed pulp placed in 2,000 gm. Denver Lab. flotation cell.
Added: 0.62 Lbs/Ton Na_2CO_3
0.0 Lbs/Ton Oleic Acid
0.16 Lbs/Ton B-24 alcohol ph 6.8

Froth heavy with much mica. Flotation time 3-4 minutes.
Rougher Conc. cleaned in 500 gm. Denver Lab. flotation cell, added 1.7 Lbs/Ton Na_2CO_3 ph 7.5
Froth heavy and thick with mica. Cleaning time 2-3 minutes
BeO determined by gravimetric method following analytical procedure outlined by Degussa Gottleutstrasse.

BUREAU OF MINES REPORT R.I. 4166 TABLE 17 - FLOTATION OF BERYL FROM R.O. HUDDLESTON PROP. RUBY MTS. NEVADA.

No.	Product	Weight		Assay (%)	Content (gms)	Distribution (%)
		Gms.	%	BeO	BeO	BeO
	Calc. Heads		100.00	1.09		100.00
	Beryl Conc.		8.30	11.10		84.4
	Middling		14.82	0.08		1.1
	Tailing		16.20	0.04		2.2
	Slime		13.03	0.75		8.9
	Mica		3.65	1.01		3.4

The ore contained 1.03% beryllia and was mainly albite, orthoclase, and microclinic feldspars, and quartz, with appreciable beryl and muscovite and small amounts of hematite, apatite, spessartite and Zircon. Iron and manganese oxide stainings also were present in small amounts.

Above is a flotation metallurgical balance, showing degree of concentration that can be attained as compared with TL - 456, United Engineering Beryl flotation, both ores being approximately of the same type, although United Engineering beryl ore seemed to contain more mica than above.

August 1947

PRELIMINARY REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

ERRINGTON - THIEL
Elko County, Nevada

By W. T. Benson[1]

- Mica, Beryl -

SUMMARY

The Errington - Thiel mica-beryl deposits are on the east flank of the Ruby Mountain, south central Elko County, Nevada, about 65 miles southeast of Elko, the supply and shipping point on the Southern and Western Pacific Railroads.

The mica and beryl bearing pegmatites were first located in 1931. They were opened and operated in a small way about three years ago. Resulting from the operation about 280 pounds of sheet mica was produced. There has been no production of beryl. Following the shut down in January 1945, all surface and mining equipment was removed from the property. Except for assessment purpose, no work has been done on the property in recent years.

Rocks in the area comprise Paleozoic sediments which have been intruded by Tertiary granite. In areas of considerable size, the sediments have been altered to mica schist which contacts the granites irregularly.

1/ Mining Engineer, Reno Division, Mining Branch, Bureau of Mines, U. S. Department of the Interior.

The mica and beryl deposits occur in pegmatite dikes and stringers which are enclosed in steeply dipping quartz-mica schist. In thickness, the dikes vary from 4 to 45 feet with lengths as much as 500 feet. In general, the dikes are concordant with the schists and are comprised of quartz and albite with subordinate microcline and muscovite mica. Accessory minerals are beryl and garnet.

The beryl present in the deposits open to inspection is too low for commercial operation, but exploration has not been sufficient to indicate satisfactorily the possible grade of the beryl in the deposits.

The mica that has been developed is of the clear variety; free of blemishes or checks, which occurs in two nearly parallel pegmatite dikes. In these areas, it would be practically impossible to accurately judge the amount of mica that eventually may be produced. In the sections opened, the percentage of mica may approximate 15 percent of the material exposed. Of this amount, possibly a few percent of the total recoverable mica might be sorted out as punch and larger book sizes.

As developed the beryl present is too low for commercial operation. The mica showings are adequate for a small operation and should the supply of mica again become critical, this deposit could be considered a source for punch and larger book sizes.

Further consideration of the property by the Bureau of Mines is not recommended at this time.

INTRODUCTION

The Errington - Thiel mica and beryl property was examined by an engineer[2] of the Bureau of Mines, August 13, 1947 accompanied by Oscar W. Thiel and Alma T. Errington, owners, Ruby Valley, Nevada.

Previously the property was examined by J. H. Wiese and M. R. Clepper and later by D. J. Fisher, geologists of the Federal Geological Survey. The property was also visited by an engineer[3] of the Bureau of Mines in October 1942 but no report was submitted relative to this examination.

Property holdings comprise 58 unpatented lode mining claims situated on the east flank of the Ruby Range sec. 16, 17, 20, 21, 28, and 29, T. 28 N., R. 58 E., Elko County, Nevada, about 65 miles southeast of Elko, the supply and shipping point on the Western and Southern Pacific Railroads. To reach the property from Elko, Highway 46 is followed south 40 miles to the Harrison Pass turnoff. The Harrison Pass road and the Ruby Valley roads are then traveled east and north to the property, a distance of 25 miles.

HISTORY

Locations were first made on the property in 1931, by M. W. Young, who in 1936 interested Mrs. Alma T. Errington on a partnership basis. Only enough work was done on the property by Mr. Young and Mrs. Errington to secure the claims. A lease was granted to the Downer Bros. in 1943. Little work was done by the lessee and the property was returned to the owners in the spring of 1944. In September 1944 a lease was granted to Vernon Parmam and Fred Story

2/ W. T. Benson
3/ Glenn L. Thompson

of Oakland, California. The lessees rehabilitated the old camp and surface tram was reconditioned. In Elko a building on Commercial Street was secured in which tables with testing lights and cutting equipment for 12 operatives was installed. Resulting from this operation approximately 250 pounds of small size sheet mica was shipped to the Colonial Mica Co., who had a representative in Moscow, Idaho. The venture apparently was not profitable and in January 1945 the lease was forfeited and the property reverted back to the owners. Mr. Young is no longer associated with the property and it is now controlled by Mrs. Errington and her brother Oscar H. Thiel. No work has been done on the property in recent years.

PHYSICAL FEATURES

The claims are located on the east flank of the Ruby Range in an area of steep and rugged topography at an altitude of 6,800 to 9,000 feet. The topography is characterized by eastward trending, sharp ridges separated by steep walled canyons.

Climate in the area is temperate with moderately cool summers and long severe winters. Precipitation occurs usually as snow with occasional rains during the fall and spring months. Usually the area is inaccessible because of heavy snows during the period November 15 to May 1. An ample supply of water in Tipton and Dawley Creeks supply water for domestic and mining needs.

Vegetation in the area comprises sage brush and aspen in the canyon bottoms with mountain mahogany, juniper, and fir and pine at the higher altitudes.

The nearest shipping point is Tobar, about 50 miles by well graded road east on the Western Pacific Railroad.

No transmitted electric power is available, and for generation of power, fuel oil was supplied in drums by truck from Nike, 65 miles north.

HOUSING FACILITIES

Aside from the small residence of Mrs. Errington, there are no housing facilities on the property for the accommodation of a crew.

EQUIPMENT

Mining equipment used by lessees has been removed from the property.

GEOLOGY AND DESCRIPTION OF THE DEPOSIT

Rocks in the area comprise Paleozoic sediments which have been intruded by Tertiary granite.

In areas of considerable size, the sediments have been altered to mica schist. Where exposed, the schist is medium grained with a well defined schistose structure that strikes N. 10° to 20° E. and dips 60° to 70° east. The schist contacts the granite irregularly. Tongues of granite extend into the main schist areas and large inclusions of schist, as float blocks, occur in the granite. The granite is of uniform texture except in areas where it is cut by pegmatite dikes.

The mica and beryllium deposits occur in pegmatite dikes and stringers which are enclosed in steeply dipping quartz-mica schist that contains local gray wacke or impure quartzite phases adjacent to the margin of the body of granite.

In the area examined, there are numerous dikes which vary from a few feet to 45 or more feet in thickness with lengths of as much as

500 feet. In general, the dikes are concordant with the schists.

The dikes consist essentially of quartz and albite with subordinate microcline and muscovite mica. Accessory minerals are beryl and garnet.

From development workings open to inspection, the amount of beryl present is too low for commercial operation, but exploration has not been sufficient to indicate satisfactorily the grade of beryl in the deposits.

The mica that has been developed occurs in two parallel dikes near the crest and on the south side of an eastward trending ridge. As exposed, the dikes strike N. 10° E. and dip 80° E. and vary in thickness from 6 to 10 feet. In them the mica occurs in stringers and as small bunches. In the bunches, book mica is present from which sheets 5 to 6 inches square could be obtained. The bunches appear to be better developed near the margin of the dikes. The mica content in the areas exposed varies from 10 to 20 percent. It is of the muscovite variety, which in thin sheets, is clear and comparatively free of blemishes or checks.

DEVELOPMENT

Development openings in the beryl section comprise a few surface cuts and an adit, all of which are now caved. In the mica area development consists of a 30 foot adit which is connected to a surface cut by a 20 foot raise. The best mica showing is exposed in surface pit 10 feet wide, 15 feet long, and excavated to a depth of 12 feet.

ORE RESERVES

Sufficient work has not been done in the areas containing beryl to permit making a satisfactory estimate of reserve tonnages.

The mica bearing dikes in the area explored are traceable on surface for possibly 300 feet. In these areas, it would be practically impossible to accurately judge the amount of mica that eventually may be produced. In the sections opened, the percentage of mica in the dike may approximate 15 percent of the material exposed. Of this amount, possibly a few percent of the total recoverable mica might be sorted out as punch and larger book sizes.

In sorted small piles on the dumps there is possibly 700 to 1,000 pounds of mica that is suitable for punch sizes.

SAMPLING

No attempt was made to sample exposed faces for mica. Representative small books and punch size material however, were obtained from the better showing in the open pit for comparison and observational purposes.

PLAN OF OPERATION

Except for work necessary to secure title to the claims, no large scale development of the deposits is contemplated by the owners at the present time.

CONCLUSIONS

From an inspection of development openings, it is apparent the amount of beryl present is too low for commerical operation, but exploration has not been sufficient to indicate satisfactorily the grade of beryl in the deposits.

Mica showings are adequate for a small operation, and from showings elsewhere on the property, it is possible additional mica bearing areas could be developed.

In the sections open to inspection, the percentage of mica in the dikes may approximate 15 percent. Of this amount, possibly a few percent of the total recoverable mica might be sorted out as punch and larger book sizes.

Sufficient mica as punch and larger book sizes is exposed so that the deposit could be classed as a source should the supply of mica again become critical.

Further consideration of the property by the Bureau of Mines is not recommended at this time.

W.M.M.
Nev-60
October 1942

WAR MINERALS MEMORANDUM[1]

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

Report of the Bureau of Mines to Hon. Harold L. Ickes,
Secretary of the Interior

ERRINGTON MICA-BERYL PROPERTY
Elko County, Nevada

-Mica-Beryl-

Summary

The Errington mica-beryl property has had little development and no production. The character and quality of the muscovite block mica so far exposed is for the most part nonstrategic and noncommercial. The property's isolation from markets is a serious handicap.

An apparently large tonnage of mica schist, occurring in the walls of the largest of the pegmatite dikes, is not suitable for marketing as ground mica.

The beryl content of the pegmatite is too small to justify any attempt at further development.

No further consideration by the Bureau is recommended.

1/ These memoranda present the facts reported by Bureau of Mines engineers regarding properties for which no further consideration is recommended. Therefore, they should be treated as confidential, for the sole use of Bureau employees. They should not be given out to the public or to the owners of the properties concerned.

Introduction

Errington's mica-beryl property in the Ruby Range, Elko County, Nevada, was examined in October 1942 by an engineer of the Bureau of Mines. This property is about 65 miles southwesterly from Wells, Nevada. The route from Wells is by U. S. Highway No. 93, 25 miles south to Warm Creek Ranch, thence by Ruby Valley graveled road southwest 40 miles to the property.

History

The Errington property includes 35 claims owned by Mrs. A. T. Errington and five claims owned by Elizabeth Shaffer. The five Shaffer claims and six of the Errington group were acquired from H. R. Castle of Elko. M. W. Young also is said to own an interest in the Errington claims. Excepting those obtained from H. R. Castle, all were located in 1941.

Physical Features

The Ruby Range is a rugged, granitic chain of mountains, some of which rise to elevations above 10,000 feet. The Errington property lies on the east slope of the Range, and varies in elevation from 6000 to approximately 9000 feet.

Description of the Deposit

Numerous pegmatite dikes occur in granite, striking N. to N. 15 W. The dikes vary in width from 2 to 12 feet or more. Dike minerals are quartz, felspar, block muscovite mica, garnet, magnetite, and a very small amount of beryl. An occasional copper stain was noted. Numerous open cuts have been made on the various dikes. The largest of these, and the most westerly of the number examined, was 12 feet in

width with a vertical face about 10 feet high, exposing block muscovite mica irregularly spaced, and small areas consisting principally of garnet and magnetite, in a gangue of quartz and felspar. About 40 tons of the mica has been removed from this cut and is now stored on the adjacent dump.

The mica crystals in the large cut are as much as 4 by 5 inches, edge dimensions. Some are broken and cracked by the toppling of the dike at the surface, caused by erosion of its walls. The mica shows some cross-grains, hairline and tangle-sheet defects, and some black-spotted-stain was noted. About five percent of the mined mica on the dump of the cut is relatively clear, only slightly smoky, and possibly of commercial value. No other cut on the property shows block mica.

The muscovite mica is of more potential strategic value than the beryl. The dike in which this cut was excavated extrudes through mica schist. The schist apparently extended for at least 20 to 30 feet from the walls of the dike, but its definite extent was obscured by overburden.

The occurrence of beryl in these dikes appears to be exceedingly limited. In a close examination of the faces of ten or twelve cuts in various dikes, the Bureau's engineer obtained only a handful of small beryl crystals. A hand-specimen of the beryl sent to the Salt Lake laboratory was reported by Dr. H. E. Read to be "a good grade of beryl". The property has produced a total of only a few hundred pounds of this mineral, according to statements by the owner and others.

The beryl crystals vary in color from nearly white to light green. Their occurrence in the dikes is so infrequent that it is believed no reasonable ratio of concentration by milling is possible. Perhaps 500 tons or more of dike rock would have to be mined and treated to obtain one ton of beryl.

Sampling

Three samples of mica were taken from the cut in the 18-foot dike and were sent to Oliver Bowles, Chief, Nonmetal Economics Division of the Bureau in Washington, for his appraisal. One sample was taken of the mica schist in the walls of the large dike. His report is:

Sample A. In crude form approximately 20 square inches. Water colored, edges badly cross-grained, slight ruling, slight clay stained, incipient "A" ruling, rather gummy throughout. Utilizable area three square inches for punch, but not economical even at present prices, difficult to split, most suitable for grinding, nonstrategic. Its price range would be from $7.50 to $21.00 per short ton.

Sample B. In crude form about 10 square inches, light rum color, slight ruling, utilizable area (after trimming edges) four square inches. Some hair-lines in the sound area, soft, suitable for punch of No. 2 clear quality, strategic, which commands a price of at least 30 cents per pound, half trimmed, North Carolina method of preparation.

Sample D. Mica schist, (from walls of large dike) muscovite with minor amounts of biotite, by grinding and beneficiation could possibly produce a low value roofing mica, although the biotite content may rule this out. Probably noncommercial.

Sample E. Suitable for grinding although most of the muscovite has been altered to chlorite and would not command the top price. Price range in western United States for similar material, $1.50 to $3.50 per ton, provided market exists within economic transportation range.

Mr. Bowles comments: "Sample B. is the only strategic quality of the lot. Although the crude book was about 10 square inches and after trimming was four square inches, the yield would not be 40 percent but more like five percent, due to large amount of mica skimmings that must be discarded in splitting off to the sound laminae."

No samples were taken of the dikes containing beryl. No more than a few small crystals of beryl were seen in place anywhere on the property.

Conclusions

It is concluded that:

1. Based upon the appraisal of samples by Oliver Bowles, the deposit has little merit as a possible producer of either strategic or commercial grades of mica.

2. Development heretofore done has exposed block mica only in one cut at the surface.

3. Relative inaccessibility of the property, its distance from market, and the extreme inexperience of the owners now attempting to exploit it, are severe handicaps to possible production of even the grades which otherwise might have a market value.

4. Beryl content of the dike material is too small to be mined at a profit. Even if war requirements demanded production of beryl without regard to cost, this property would be unattractive for the reason that as now developed, only limited production could be expected.

No development of this property by the Bureau is recommended.

UNITED STATES
DEPARTMENT OF THE INTERIOR
OSCAR L. CHAPMAN, SECRETARY

DEFENSE MINERALS ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION III

DMA-1101X - Errington-Thiel Beryl, mica Property

Elko County, Nev.

John D. Warne, Mining Engineer
U. S. Bureau of Mines

July 17, 1951

DOCKET DMA-1101X

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

ERRINGTON-THIEL BERYL, MICA MINE
Elko County, Nev.

SUMMARY

A Bureau of Mines engineer[1] re-examined the Errington-Thiel beryl, mica property on June 29, 1951.

The deposits are located in the Dawley Canyon Area, on the east flank of the Ruby Mountains, south central Elko County, Nev. (Fig. 1).

Examination was made pursuant to an application for loan to conduct an exploration project, Docket DMA-1101X. William A. Reinken and Robert C. Horton (lessees) are the applicants.

This report supplements and includes Preliminary Report by G. L. Thompson[2] and War Minerals Memorandum by W. T. Benson[2] covering previous examinations by the Bureau of Mines. A report and maps by E. N. Hinrichs[3] and others, submitted with the application, were also used in consideration of the proposed project.

Six samples were taken to determine the berrylia content of the deposits exposed in workings on the property.

1/ John D. Warne, Mining Engineer, Mining Division, Region III.
2/ Mining Engineers, Bureau of Mines, Reno, Nevada.
3/ Geologist, U. S. Geological Survey.

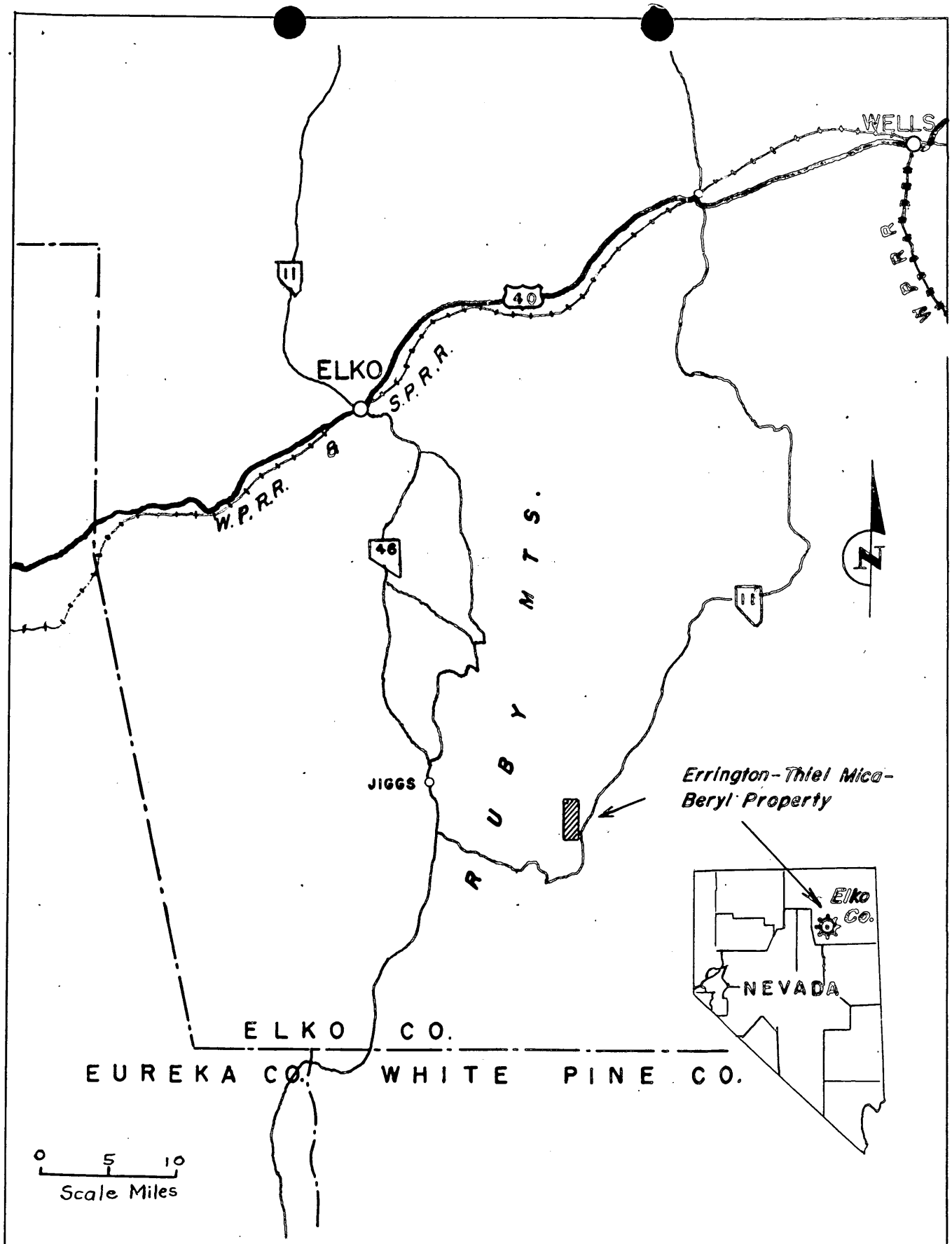


FIG. 1 LOCATION MAP ERRINGTON-THIEL PROPERTY

SAMPLING (Supplement)

Samples were taken from those pegmatites which have been exposed by previous work. More extensive sampling of the same deposits and of others could be accomplished by removing a shallow overburden.

The following samples (see fig. 2) indicate the beryllia content of the pegmatite deposits:

Sample No.	% BeO	Description
1	0.00	Horizontal channel sample across face of mica-beryl adit, Mica-beryl Nos. 384 claims, 5 ft. length.
2	0.00	Bulk grab sample from muck pile at face of Mica-Beryl adit.
3	0.00	Bulk grab sample from muck pile, 15 feet from face of Mica-Beryl adit.
4	0.03	Channel sample across portion of pegmatite deposit which appears to contain beryl, 1.4' length, taken 40 feet from portal of Mica-Beryl adit.
5	0.00	Specimen sample of pegmatite material from prospect hole, Mica-Beryl No. 4 claim.
6	0.00	Channel sample of pegmatite material exposed in prospect hole on N. side of Dawley Creek.

No mica of sufficient size or quality to be of a commercial grade appeared to be contained in the deposits which were sampled. No samples on specimens of this commodity were taken. However, an appraisal by Oliver Boyles[4/] of mica samples taken from a cut in a 12-foot dike on the property is contained in the Preliminary Report attached.

METALLURGICAL TESTS

Work done on the beneficiation of a small sample of beryl ore containing 2.97% BeO by which a concentrate of 7.69% BeO was supplied by

4/ Chief, Nonmetal Economic Division, Bureau of Mines, Washington, D.C.

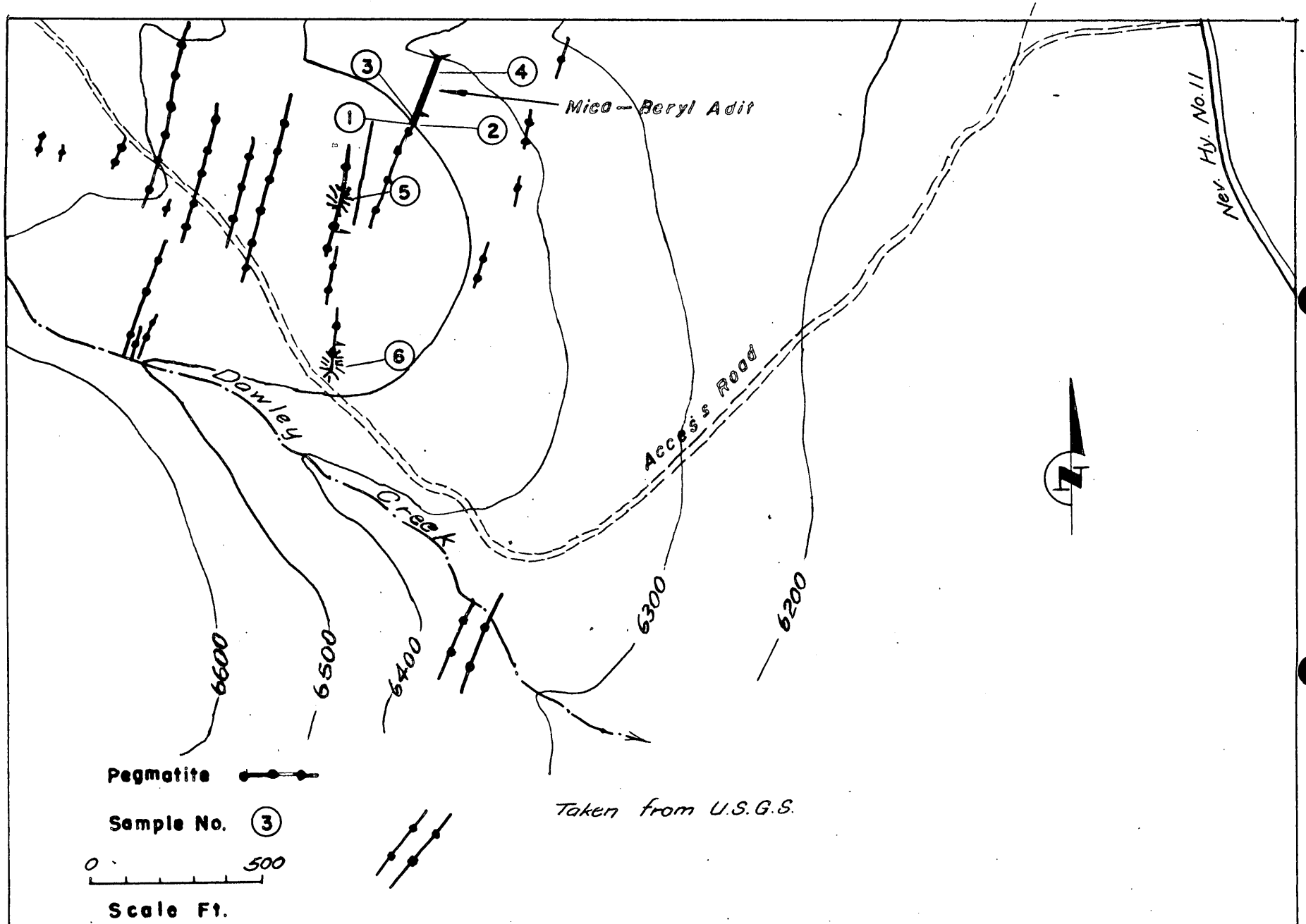


FIG. 2 SAMPLE MAP – ERRINGTON-THIEL MICA, BERYL PROPERTY – ELKO CO., NEVADA

the applicant. These data are attached. Other metallurgical tests previously performed on beryl ores from the same district by the Bureau of Mines[5] were presented with the application.

CONCLUSIONS

1. Development heretofore done has not been sufficient to indicate the grade of beryl and mica in all of the pegmatite occurrences on the property.

2. The analysis of samples taken by the Bureau of Mines from some of the pegmatite deposits indicate that no commercial grade of beryl ore exists.

3. Samples previously appraised by Oliver Boyles indicate that the deposits have little merit as a possible producer of either strategic or commercial grades of mica.

4. Inaccessibility of the property, its distance from the market, and the doubtful success of concentrating low grade beryl or processing the mica, are serious handicaps to possible production of even the grades of ore which otherwise might have a market value.

RECOMMENDATIONS

1. No participation by the Government in further exploration of this property is recommended.

2. Factual information gained through examinations of the property should be imparted to the present lessees to preclude further work on the deposits now believed to be unworthy of further development, and to encourage exploration by him of new deposits.

5/ Report of Investigations 4166 - "Flotation of Beryllium Ores" by J. S. Kennedy and R. G. O'Meara, January 1948, p. 14.

C O P Y

May 29, 1951.

TL - 656

FLOTATION OF BERYL ORE

FROM UNITED ENGINEERS OF RENO NEVADA

SAMPLES:

Pegmatite material containing feldspar, mica, quartz, and beryl. Total weight $5\frac{1}{2}$ Lbs. and ranging in size from 1" to fines.

Calculated assay (from test products) 2.97% BeO.

GENERAL CONSIDERATIONS:

The quantity of sample was only sufficient for one flotation test. The grinding and flotation proceedure recommended by the Bureau of Mines in the Report of Investigations No. 4166, January 1948, was followed.

CONCLUSION:

No. 1 The Beryl in this ore can be concentrated by flotation. A Beryl concentrate was produced which assayed 7.69% BeO and contained 64.98% of the total BeO. Further test work would be required to improve the grade of the concentrate and the recovery of BeO.

No. 2 The grade of the concentrate could probably be improved by a preliminary rougher float to remove mica.

No. 3 The recovery could probably be improved by varying the grinding and sizing to reduce the quantity of slimes.

The slimes in this test represented; 33.44 Weigh %; 2.59% BeO Assay; 32.00% BeO Distribution.

R. G. Jones

MAY 31, 1951. TL - 656 FLOTATION OF BERYL ORE FROM UNITED ENGINEERING, 252 W. 1st. St., RENO, NEVADA

No.	Product	Weight		Assay (%)	Content (gms)	Distribution (%)
		Gms.	%	BeO	BeO	BeO
	Head Assay (Calc)		100.00	2.97		100.00
	+10 Mesh Mica		5.56	3.56		6.68
	-10 Mesh Ore		94.44	2.93		93.32
	Calc. -10 Mesh Ore	2,177	100.00	2.71	58.94	100.00
	+65 & +100 Mica	97	4.46	0.60	0.58	0.98
	Decanted Slimes	728	33.44	2.59	18.86	32.00
	Flot. Conc.	498	22.88	7.69	38.30	64.98
	Flot. Mids	76	3.49	0.36	0.27	0.46
	Flot. Tails	778	35.74	0.12	0.93	1.58

PROCEDURE: Sample as received consisted of approximately 2.5 kgs. of coarse pieces of mica, quartz, feldspar, and beryl ore, some about +2 inch mesh with large plates of mica imbedded in same. Roll crushed -10 mesh. After several passes thru rolls, +10 mesh appeared to be all mica which was not amenable to further roll crushing. Reserved for separate assay as shown above, -10 mesh product used for flotation test. Following Bureau of Mines Report R.I. 4166 proceeded as follows: Stage ground wet in Lab. ball mill, screening on 65 mesh until +65 appeared to be all mica. -65 now screened on 100 mesh. +100 stage ground -100 until +100 appeared to be all mica. Combined +65 and +100 mica for assay. De-slimed -100 ore thoroughly by settling and decanting. Slime screened on 200 mesh since quantity of same appeared to be quite high. +200 re-deslimed and added to balance of deslimed ore. Slime thickened, filtered, and dried.

Conditioning for Flotation: 9.2 Lbs/Ton HF (48%) added to ore pulp of about 50% solids and agitated 30 minutes. Ph 2.0 - 2.5. Settled, decanted, and washed 5 times before ph same as tap water, ph 5.0

Flotation: Conditioned washed pulp placed in 2,000 gm. Denver Lab. flotation cell.
Added: 0.62 Lbs/Ton Na_2CO_3
9.0 Lbs/Ton Oleic Acid
0.16 Lbs/Ton B-24 alcohol ph 6.8

Froth heavy with much mica. Flotation time 3-4 minutes.
Rougher Conc. cleaned in 500 gm. Denver Lab. flotation cell, added 1.7 Lbs/Ton Na_2OO_3 ph 7.5
Froth heavy and thick with mica. Cleaning time 2-3 minutes
BeO determined by gravimetric method following analytical procedure outlined by Degussa Gutleutstrasse.

BUREAU OF MINES REPORT R.I. 4166 TABLE 17 - FLOTATION OF BERYL FROM R.O. HUDDLESTON PROP. RUBY MTS. NEVADA.

No.	Product	Weight		Assay (%)	Content (gms)	Distribution (%)
		Gms.	%	BeO	BeO	BeO
	Calc. Heads		100.00	1.09		100.00
	Beryl Conc.		8.30	11.10		84.4
	Middling		14.82	0.08		1.1
	Tailing		16.20	0.04		2.2
	Slime		13.03	0.75		8.9
	Mica		3.65	1.01		3.4

The ore contained 1.03% beryllia and was mainly albite, orthoclase, and microclinic feldspars, and quartz, with appreciable beryl and muscovite and small amounts of hematite, apatite, spessartite and Zircon. Iron and manganese oxide stainings also were present in small amounts.

Above is a flotation metallurgical balance, showing degree of concentration that can be attained as compared with TL - 656, United Engineering Beryl flotation, both ores being approximately of the same type, although United Engineering beryl ore seemed to contain more mica than above.

August 1947

PRELIMINARY REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

ERRINGTON - THIEL
Elko County, Nevada

By W. T. Benson[1]

- Mica, Beryl -

SUMMARY

The Errington - Thiel mica-beryl deposits are on the east flank of the Ruby Mountain, south central Elko County, Nevada, about 65 miles southeast of Elko, the supply and shipping point on the Southern and Western Pacific Railroads.

The mica and beryl bearing pegmatites were first located in 1931. They were opened and operated in a small way about three years ago. Resulting from the operation about 250 pounds of sheet mica was produced. There has been no production of beryl. Following the shut down in January 1945, all surface and mining equipment was removed from the property. Except for assessment purpose, no work has been done on the property in recent years.

Rocks in the area comprise Paleozoic sediments which have been intruded by Tertiary granite. In areas of considerable size, the sediments have been altered to mica schist which contacts the granites irregularly.

1/ Mining Engineer, Reno Division, Mining Branch, Bureau of Mines, U. S. Department of the Interior.

The mica and beryl deposits occur in pegmatite dikes and stringers which are enclosed in steeply dipping quartz-mica schist. In thickness, the dikes vary from 4 to 45 feet with lengths as much as 300 feet. In general, the dikes are concordant with the schists and are comprised of quartz and albite with subordinate microcline and muscovite mica. Accessory minerals are beryl and garnet.

The beryl present in the deposits open to inspection is too low for commercial operation, but exploration has not been sufficient to indicate satisfactorily the possible grade of the beryl in the deposits.

The mica that has been developed is of the clear variety; free of blemishes or checks, which occurs in two nearly parallel pegmatite dikes. In these areas, it would be practically impossible to accurately judge the amount of mica that eventually may be produced. In the sections opened, the percentage of mica may approximate 15 percent of the material exposed. Of this amount, possibly a few percent of the total recoverable mica might be sorted out as punch and larger book sizes.

As developed the beryl present is too low for commercial operation. The mica showings are adequate for a small operation and should the supply of mica again become critical, this deposit could be considered a source for punch and larger book sizes.

Further consideration of the property by the Bureau of Mines is not recommended at this time.

INTRODUCTION

The Errington - Thiel mica and beryl property was examined by an engineer[2/] of the Bureau of Mines, August 12, 1947 accompanied by Oscar W. Thiel and Alma T. Errington, owners, Ruby Valley, Nevada.

Previously the property was examined by J. H. Wiese and M. R. Clepper and later by D. J. Fisher, geologists of the Federal Geological Survey. The property was also visited by an engineer[3/] of the Bureau of Mines in October 1942 but no report was submitted relative to this examination.

Property holdings comprise 55 unpatented lode mining claims situated on the east flank of the Ruby Range sec. 16, 17, 20, 21, 28, and 29, T. 29 N., R. 58 E., Elko County, Nevada, about 65 miles southeast of Elko, the supply and shipping point on the Western and Southern Pacific Railroads. To reach the property from Elko, Highway 46 is followed south 40 miles to the Harrison Pass turnoff. The Harrison Pass road and the Ruby Valley roads are then traveled east and north to the property, a distance of 25 miles.

HISTORY

Locations were first made on the property in 1931, by M. W. Young, who in 1936 interested Mrs. Alma T. Errington on a partnership basis. Only enough work was done on the property by Mr. Young and Mrs. Errington to secure the claims. A lease was granted to the Downer Bros. in 1943. Little work was done by the lessee and the property was returned to the owners in the spring of 1944. In September 1944 a lease was granted to Vernon Farnam and Fred Story

2/ W. T. Benson
3/ Glenn L. Thompson

of Oakland, California. The lessees rehabilitated the old camp and surface tram was reconditioned. In Elko a building on Commercial Street was secured in which tables with testing lights and cutting equipment for 12 operatives was installed. Resulting from this operation approximately 250 pounds of small size sheet mica was shipped to the Colonial Mica Co., who had a representative in Moscow, Idaho. The venture apparently was not profitable and in January 1945 the lease was forfeited and the property reverted back to the owners. Mr. Young is no longer associated with the property and it is now controlled by Mrs. Errington and her brother Oscar W. Thiel. No work has been done on the property in recent years.

PHYSICAL FEATURES

The claims are located on the east flank of the Ruby Range in an area of steep and rugged topography at an altitude of 6,500 to 9,000 feet. The topography is characterized by eastward trending, sharp ridges separated by steep walled canyons.

Climate in the area is temperate with moderately cool summers and long severe winters. Precipitation occurs usually as snow with occasional rains during the fall and spring months. Usually the area is inaccessible because of heavy snows during the period November 15 to May 1. An ample supply of water in Tipton and Dawley Creeks supply water for domestic and mining needs.

Vegetation in the area comprises sage brush and aspen in the canyon bottoms with mountain mohogany, juniper, and fir and pine at the higher altitudes.

The nearest shipping point is Tobar, about 50 miles by well graded road east on the Western Pacific Railroad.

No transmitted electric power is available, and for generation of power, fuel oil was supplied in drums by truck from Elko, 65 miles north.

HOUSING FACILITIES

Aside from the small residence of Mrs. Errington, there are no housing facilities on the property for the accommodation of a crew.

EQUIPMENT

Mining equipment used by lessees has been removed from the property.

GEOLOGY AND DESCRIPTION OF THE DEPOSIT

Rocks in the area comprise Paleozoic sediments which have been intruded by Tertiary granite.

In areas of considerable size, the sediments have been altered to mica schist. Where exposed, the schist is medium grained with a well defined schistose structure that strikes N. 10° to 20° N. and dips 60° to 70° east. The schist contacts the granite irregularly. Tongues of granite extend into the main schist areas and large inclusions of schist, as float blocks, occur in the granite. The granite is of uniform texture except in areas where it is cut by pegmatite dikes.

The mica and beryllium deposits occur in pegmatite dikes and stringers which are enclosed in steeply dipping quartz-mica schist that contains local gray wacke or impure quartzite phases adjacent to the margin of the body of granite.

In the area examined, there are numerous dikes which vary from a few feet to 45 or more feet in thickness with lengths of as much as

300 feet. In general, the dikes are concordant with the schists.

The dikes consist essentially of quartz and albite with subordinate microcline and muscovite mica. Accessory minerals are beryl and garnet.

From development workings open to inspection, the amount of beryl present is too low for commercial operation, but exploration has not been sufficient to indicate satisfactorily the grade of beryl in the deposits.

The mica that has been developed occurs in two parallel dikes near the crest and on the south side of an eastward trending ridge. As exposed, the dikes strike N. 10° E. and dip 60° E. and vary in thickness from 6 to 10 feet. In them the mica occurs in stringers and as small bunches. In the bunches, book mica is present from which sheets 3 to 6 inches square could be obtained. The bunches appear to be better developed near the margin of the dikes. The mica content in the areas exposed varies from 10 to 20 percent. It is of the muscovite variety, which in thin sheets, is clear and comparatively free of blemishes or checks.

DEVELOPMENT

Development openings in the beryl section comprise a few surface cuts and an adit, all of which are now caved. In the mica area development consists of a 30 foot adit which is connected to a surface cut by a 20 foot raise. The best mica showing is exposed in surface pit 10 feet wide, 15 feet long, and excavated to a depth of 12 feet.

ORE RESERVES

Sufficient work has not been done in the areas containing beryl to permit making a satisfactory estimate of reserve tonnages.

The mica bearing dikes in the area explored are traceable on surface for possibly 300 feet. In these areas, it would be practically impossible to accurately judge the amount of mica that eventually may be produced. In the sections opened, the percentage of mica in the dike may approximate 15 percent of the material exposed. Of this amount, possibly a few percent of the total recoverable mica might be sorted out as punch and larger book sizes.

In sorted small piles on the dumps there is possibly 700 to 1,000 pounds of mica that is suitable for punch sizes.

SAMPLING

No attempt was made to sample exposed faces for mica. Representative small books and punch size material however, were obtained from the better showing in the open pit for comparison and observational purposes.

PLAN OF OPERATION

Except for work necessary to secure title to the claims, no large scale development of the deposits is contemplated by the owners at the present time.

CONCLUSIONS

From an inspection of development openings, it is apparent the amount of beryl present is too low for commerical operation, but exploration has not been sufficient to indicate satisfactorily the grade of beryl in the deposits.

Mica showings are adequate for a small operation, and from showings elsewhere on the property, it is possible additional mica bearing areas could be developed.

In the sections open to inspection, the percentage of mica in the dikes may approximate 15 percent. Of this amount, possibly a few percent of the total recoverable mica might be sorted out as punch and larger book sizes.

Sufficient mica as punch and larger book sizes is exposed so that the deposit could be classed as a source should the supply of mica again become critical.

Further consideration of the property by the Bureau of Mines is not recommended at this time.

6/5/51

Defense Minerals Administration

Review of Application for Exploration Assistance

Docket No. 1101-X

Commodity Mica, Beryl

Total Amount $49,140

Govt. Participation 90%

1. Name and Address of Applicant William A. Reinken & Robert C. Horton, 252 West First St., Reno, Nevada

2. Location of Property Dawley Canyon Area, Ruby Mountains, Elko Co., Nevada

3. Mineral or metal Mica, Beryl Is it listed in Section 9 of MO-5?

If not, application will be rejected.

4. Geologic probability of discovery—based on data in application (question #16, 17, 18, 20 and 22)*

Mines or Survey reports, etc., do you rate chances:

a) Good

b) Poor

c) ✓ None

d) ✓ Don't know—needs field examination See Reddin Memo, attached

e) Is there an alternative and favorable project? (If so, attach an explanation)

5. Is the applicant's right to the property clearly stated? Yes, Lessee (question 5, 6, 7)*

6. If applicant is a lessee, is a copy of the lease attached? Yes

Does the lease have sufficient time to run to cover a future productive period? Yes

*question numbers are those of MF-103

7. Are subordination agreements necessary? yes

a) MF-201? _____

b) MF-202 ✓ Must be secured

8. From the data presented, does the proposed project appear feasible from the point of view of:

a) Available manpower yes

b) Equipment and supplies yes
(Question 14 plus general knowledge of availability)*

c) Accessibility (question 12)* yes

d) Water (question 13)* yes

e) Power (question 13)* yes

Is a field check needed on any of these points? NO

9. Does the experience of the applicant appear to be adequate to assure that he can properly conduct the proposed project? (question 4)* Not known

Is a field check needed on this point? yes

10. Exhibit A. (questions 21 and 22)*

a) Is the project adequately described? NO

If not, are there sufficient data given so that you can describe the project? NO If so, attach a draft.

b) Is there an adequate map or sketch of the proposed work? NO

c) Is the proposed work "exploration" under the definition of Section 8, MO-5? yes – but underground work should

If not, what part of it is? not be undertaken until surface sampling, pitting, etc. produces evidence of strategic Mica in fair amounts and gives some indication of possible beryl tonnage!

Is this part a worthwhile exploration project? Yes, Subject Field Exam

d) Are the cost estimates detailed? Not with respect to footage

Can they be summarized, as on page 2 of Procedural Instruction 5-A, from the available data? NO If so, attach a draft.

e) Are the cost estimates reasonable? Appear high

f) Should more information be requested from applicant? Yes

g) Is a field examination necessary to complete Exhibit A? Yes

11. Exhibit B (question 23-d)*

a) Is it applicable? Yes

b) If so, are sufficient data furnished? NO If so, attach a draft.

c) Is a field check needed? Yes

12. Exhibit C (question 23-e, f and g)*

a) Is it applicable? Yes

b) Sufficient data? NO If so, attach a draft.

c) Are rents and charges reasonable? High

d) Is a field check needed? Yes

13. Exhibit D (question 23-a, b)*

a) Are there sufficient data? Yes

b) Is the schedule adequate for the work proposed? Yes

c) Is the schedule excessive for the work proposed? Yes

d) Are the proposed wages and salaries reasonable? NO

e) Is a field check needed? Yes

14. Exhibit E (question 23-c)*

a) Is it applicable? Not Applicable

b) Sufficient data?

c) Reasonable?

d) Field check needed? NO

15. In your judgment, can the proposed work be done in the proposed time? yes

(All exploration must be completed within two years)

16. If field examination is not needed, attach your recommendation.

17. If field examination is needed, do you have any special instructions for the field team not indicated by your answers to the foregoing question? Is any strategic Mica in evidence? Any beryl which might be hand sorted? It seems doubtful if exploration for concentrating beryl would be justified - However if there appears a reasonable chance of getting some strategic mica and/or sortable beryl in addition to disseminated beryl for future concentration then an exploration program on a reduced scale should be worked out with applicant - Explore possibility of initial prospecting by surface work only with simpler tools - Is there any real need for Road work to accomplish initial Exploration? Why so much technical & Supervisory personnel?

Reviewed by: [illegible]

Date 6/11

97692

Answer to question 4, DMA Application 1101X.

c. None - Based on assumption that at present it is impossible to recover beryl as fine-grained as this.

If the recovery of beryl less than 0.5 cm. is commercially feasible, my recommendation then becomes (b) Poor --

The applicant mistakenly states that the pegmatites contain from 0.5 to 1.0 percent of BeO. The attached geologic report describes the deposits as containing from 0.0 to 1.6 percent beryl. I believe from the evidence of the attached geologic report that the average grade is about 0.6 percent beryl. Assuming that beryl is worth $40/unit (somewhat greater than the present price) and that they recover 85% of the beryl, this ore is worth $2/ ton. If the total beryl recovered was as great as 1 percent/ton of ore it would still be worth only $4/ton. The value of scrap mica recovered would not exceed $.60 /ton of ore.

I doubt that ore, valued at $2.60/ton, which would have to be mined and submitted to a complicated milling process, could be profitable.

Recommended by
Jack A. Redden

6/5/51

Defense Minerals Administration

Review of Application for Exploration Assistance

Docket No. 1101-X

Commodity Mica, Beryl

Total Amount $49,140

Govt. Participation 90%

1. Name and Address of Applicant William A. Renner & Robert C. Horton, 252 West First St., Reno, Nevada

2. Location of Property Dayton Canyon Area, Pilot Mountains, Esmeralda Co., Nevada

3. Mineral or metal Mica, Beryl Is it listed in Section 9 of MO-5?

If not, application will be rejected.

4. Geologic probability of discovery—based on data in application (question #16, 17, 18, 20 and 22)*

Mines or Survey reports, etc., do you rate chances:

a) Good

b) Poor

c) ✓ None

d) ✓ Don't know—needs field examination See Report Memo, Attached

e) Is there an alternative and favorable project? (If so, attach an explanation)

5. Is the applicant's right to the property clearly stated? Yes, Lessee (question 5, 6, 7)*

6. If applicant is a lessee, is a copy of the lease attached? Yes

Does the lease have sufficient time to run to cover a future productive period? Yes

*question numbers are those of MF-103

7. Are subordination agreements necessary? Yes

a) MF-201? _____

b) MF-202 ✓ Must be secured

8. From the data presented, does the proposed project appear feasible from the point of view of:

a) Available manpower Yes

b) Equipment and supplies Yes
(Question 14 plus general knowledge of availability)*

c) Accessibility (question 12)* Yes

d) Water (question 13)* Yes

e) Power (question 13)* Yes

Is a field check needed on any of these points? No

9. Does the experience of the applicant appear to be adequate to assure that he can properly conduct the proposed project? (question 4)* Not known

Is a field check needed on this point? Yes

10. Exhibit A. (questions 21 and 22)*

a) Is the project adequately described? No

If not, are there sufficient data given so that you can describe the project? No If so, attach a draft.

b) Is there an adequate map or sketch of the proposed work? No

c) Is the proposed work "exploration" under the definition of Section 8, MO-5? Yes – but underground work should

If not, what part of it is? not be undertaken until surface sampling, pitting, etc. produces evidence of structure. Map in Exh. consists and gives some indication of possible target areas.

Is this part a worthwhile exploration project? Yes, Suggest Field Exam

d) Are the cost estimates detailed? Not with respect to [illegible]

Can they be summarized, as on page 2 of Procedural Instruction 5-A, from the available data? NO If so, attach a draft.

e) Are the cost estimates reasonable? Appear high

f) Should more information be requested from applicant? Yes

g) Is a field examination necessary to complete Exhibit A? Yes

11. Exhibit B (question 23-d)*

a) Is it applicable? Yes

b) If so, are sufficient data furnished? NO If so, attach a draft.

c) Is a field check needed? Yes

12. Exhibit C (question 23-e, f and g)*

a) Is it applicable? Yes

b) Sufficient data? NO If so, attach a draft.

c) Are rents and charges reasonable? High

d) Is a field check needed? Yes

13. Exhibit D (question 23-a, b)*

a) Are there sufficient data? Yes

b) Is the schedule adequate for the work proposed? Yes

c) Is the schedule excessive for the work proposed? Yes

d) Are the proposed wages and salaries reasonable? NO

e) Is a field check needed? Yes

14. Exhibit E (question 23-c)*

a) Is it applicable? Not Applicable

b) Sufficient data?

c) Reasonable?

d) Field check needed? NO

15. In your judgment, can the proposed work be done in the proposed time? Yes

(All exploration must be completed within two years)

16. If field examination is not needed, attach your recommendation.

17. If field examination is needed, do you have any special instructions for the field team not indicated by your answers to the foregoing question? Is any strategic mica in evidence? Any beryl which might be hand sorted? It seems doubtful if exploration for concentrating beryl would be justified - However if there appears a reasonable chance of getting some strategic mica and/or sortable beryl in addition to disseminated beryl for future concentration then an exploration program on a reduced scale should be worked out with applicant - Entire possibility of initial prospecting by surface work only with separate [illegible] - Is there any real need for road work to accomplish initial exploration? Why so much technical & supervisory personnel?

Reviewed by: [illegible]

Date 6/11

97692

Answer to question 4, DMA Application 1101X.

c. None - Based on assumption that at present it is impossible to recover beryl as fine-grained as this.

If the recovery of beryl less than 0.5 cm. is commercially feasible, my recommendation then becomes (b) Poor --

The applicant mistakenly states that the pegmatites contain from 0.5 to 1.0 percent of BeO. The attached geologic report describes the deposits as containing from 0.0 to 1.6 percent beryl. I believe from the evidence of the attached geologic report that the average ~~0.5 to 1.07 BeO~~ grade is about 0.6 percent beryl. Assuming that beryl is worth $40/unit (somewhat greater than the present price) and that they recover 85% of the beryl this ore is worth $2/ ton. If the total beryl recovered was as great as 1 percent/ton of ore it would still be worth only $4/ton. The value of scrap mica recovered would not exceed $.60 /ton of ore.

I doubt that ore, valued at $2.60/ton, which would have to be mined and submitted to a complicated milling process, could be profitable.

JARedden:jeh
G-6/8/51

cc: Redden

FILE COPY
SURNAME:

Wesley Barr

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

June 12, 1951

Memorandum:

To: Stanley M. Walker, Acting Chief
Housing and Utilities Branch

From: James A. Barr, Chief
Industrial Minerals Branch

Subject: DMA-1101-X - Beryl, Mica $49,190 90%
William A. Reinken and Robert C. Horton
252 West First Street, Reno, Nevada

Subject application includes road construction cost of $5,000. Unspecified distance and location—apparently from Ruby Valley Road about 60 miles from Wells, Nevada into Dawley Canyon area, Ruby Mountains, Elko County, Nevada. Referred to field team.

James A. Barr, Sr.

RW:dak

cc: Mr. Strobel
Mr. Barr
Files

Refer to	Date
Answered	

[illegible]
[illegible]
[illegible]
WASHINGTON, D.C.

DEPARTMENT OF INTERIOR
BUREAU OF MINES
REGION IV
RECEIVED
JUN 1 3 1951
SAN FRANCISCO, CALIFORNIA

June 12, 1951

Mr. H. C. Miller
1415 Appraisers Building
San Francisco, California

Dear Mr. [illegible]

We attach Notice of Application for Exploration [illegible]

on:

Docket No. DMA-1101-X

Heading: Beryl, Mica

Applicant William A. Reinken and Robert C. Horton

Please expedite the consideration of this application with particular reference to the points [illegible] the [illegible]

Very truly yours,

Tom Lyon
Tom Lyon, Chief,
Contracting Officer

Louise B. Moon
For Director of Mines

Olga L. Ron
For [illegible]

[illegible]
[illegible]
[illegible]
[illegible]
WASHINGTON, D.C.

June 12, 1951

Mr. H. C. Miller
1415 Appraisers Building
San Francisco, California

Dear Sir:

We attach Notice of Application for Exploration Permit on:

Locator No. DMA-1101-X

Commodity Beryl, Mica

Applicant William A. Reinken and Robert C. Horton

Please expedite the consideration of this application with particular reference to the [illegible] to be attached [illegible]

Very truly yours,

[illegible]
Coordinating Committee

For Bureau of Mines

For Geological Survey

FILE COPY
SURNAME:

Barr

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

May 15, 1951

Mr. E. J. Schrader
19 Sierra Street
Reno, Nevada

Dear Erich:

I have your letter of May 8, 1951 in regard to application of DMA-1101. We will expedite the application as rapidly as possible.

We will take the first steps and then refer the application to the U. S. G. S. for a report.

Sincerely yours,

James Barr

James A. Barr, Sr., Chief
Industrial Minerals Branch

JAB:sgl
cc: Mr. Barr
Mr. Strobel
F I L E S

(Hand written postscript) How are you these days -
Have you any interesting minerals to report.

JAB

Barr, Jim

E. J. SCHRADER
ENGINEER OF MINES
19 SIERRA STREET
RENO, NEVADA

ADDRESS MAIL TO
P. O. BOX 244
RENO, NEVADA

Ans 5-15-51
JAB

May 8, 1951.

Mr.James A Barr,
Defense Minerals Administration,
Dept. of the Interior,
Washington 25, D.C.

Dear Jim;-

I have just seen a letter concerning application DMA-1101 and noted that it was referred to you.

I know the two young engineers who have asked for this loan and they have a good standing here. I have heard of the Beryl deposits in the Ruby Mts. near Elko almost since I cametto Nevada in 1912. The geological reports the boys have shown to me indicate that there are a large number of pegmatite dykes very few of which have been examined. The only detailed study they showed to me covered a small area only.

I do not know of any engineers report on the area and believe that the reason is that until recently Beryl was just one of those minerals you heard about with very little value.

If you can do anything to expedite the consideration of the applications the boys made it will be appreciated. I know how often reports get put to the bottom of the files when men are overworked and the number alone (1101) would give one pause to reflect.

It was nice to see you in Chicago. Geo.H.Morgan, M.C.M. '08 dropped in for about an hour last week.

With best regards, I am,

Sincerely yours,

Erich

E.J.Schrader.

FILE COPY
SURNAME:

Started

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

May 4, 1951

Messrs. William Reinken and
Robert C. Horton
252 West First Street
Reno, Nevada

Subject: DMA-1101
Re: Loan - $49,140

Gentlemen:

Receipt is acknowledged of your application and attachments of April 25 for a Government loan under the Defense Production Act of 1950.

The application was assigned Docket Number 1101 and referred to Mr. James A. Barr, Chief, Industrial Minerals Branch, on May 3.

In any future correspondence relating to your application, kindly refer to DMA-1101.

Sincerely yours,

LANDON F. STROBEL

Landon F. Strobel a.e.c
Executive Secretary

LFSTROBEL:aec
copies to Strobel-2
Files
Mr. Barr
Mr. Lyon

Form MF-103
(April 1951)

U. DEPARTMENT OF THE INTERI

DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dma/ 1101

Date received 5/21/51

Participation

William A. Reinken
Robert C. Horton
252 West First Street
Reno, Nevada

Name and address of applicant

Date April 25, 1951

FILL IN THIS BLOCK

Date of application April 25, 1951

Estimated cost $49,140

Mineral or metal Beryl and Mica

Percentage of Government participation 90%

Location of mine Elko County, Nevada

Date of filing MF-100 April 25, 1951

DMA Docket Number, if available dma/ 1101

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?

*2. If a partnership, state names and addresses of partners.

*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.

*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.

*5. Are you the owner or the lessee of the property?

6. If owner, state what claims, liens, or encumbrances, if any, are against the property.

7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.

9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

    NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.
*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.
*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.
*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.
15. State in detail how the ore could be shipped and how and where milled.
*16. History:
    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.
    (*b*) State briefly the known history and production of adjoining and neighboring properties.
    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.
*17. Production:
    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)
    (*a*) Describe the ore or mineral deposits briefly.
    (*b*) Submit available maps and assay data.
    (*c*) Give estimated tonnage and grade of each class of ore reserves.
19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?
21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.
22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
    (*b*) Supervisors, by numbers and positions, with salaries of each.
    (*c*) Cost of necessary repairs to existing facilities, structures, and buildings.
    (*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.
    (*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.
    (*f*) Cost of rental for equipment which the operator proposes to rent.
    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.
    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.
    (*i*) Cost of power, water, utilities, and any other items not provided for above.
24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

(Name of company)

April 25, 1951
(Date)

By Robert C. Norton
(Signature of authorized official)

President
(Title)

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

1. thru 5. Answered on MF-100

6. No claims, liens, or encumbrances are against the property.

7. A copy of the lease, which is in good standing, is attached.

8. This being a new venture, no financial statement is available.

9. We are prepared to invest $5,000, which is sufficient to pay our share of the costs of exploration in accordance with the regulations on Government participation.

10. (a) The property is located in the Ruby Mountains, Elko, County, Nevada, and more particularly, in Township 29 North, Range 58 East, Mount Diablo Base and Meridian. There are no operating mines on or near the property.

    (b) There is no legal description available, as these are unpatented mining claims. The area is described in the attached lease. Both areas in (a) and (b) are the same.

11. thru 14. Answered on MF-100.

15. The ore will be concentrated at the mine. The concentrates will then be hauled to Tobar, on the Western Pacific Railroad, and then shipped to the Beryllium Corporation of America, or to other buyers.

16. thru 18. Answered on MF-100.

19. Any conditions or circumstances not brought out by the foregoing questions have been discussed in form MF-100.

20. The exploration will be conducted in an effort to block out sufficient tonnage of beryl ore to warrant the construction of a mill. Sheet and fine ground ruby mica will also be produced and will allow us to mine a lower grade of beryl ore than if beryl alone were produced.

21. A complete geological map of the area will be made. All the pegmatite dikes which contain beryl will be sampled. Those dikes which appear to contain commercial ore will be sampled in detail. Three or four short drifts will be driven in the richer dikes to determine the character of the ore at depth and to aid in the calculation of the minimum tonnage of beryl ore present.

    In conjunction with the Western Machinery Company and the Western Knapp Engineering Company we will design a mill to treat the ore, providing the results warrant it.

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

This project will take four (4) months.

22. The area was mapped by J. C. Olson, R. E. Burns, and E. N. Hinrichs of the U. S. Geological Survey in 1948. The title of the map is "The Dawley Canyon Pegmatite Area, Ruby Mountains, Elko, County, Nevada." E. N. Hinrichs also compiled a geologic report of a small area, which gives the general geology of the region. The title of his report is "The Pegmatites of the Errington-Thiel Mine, Elko County, Nevada." A copy of the map and report is attached.

Very few samples have been taken at the property. In the past there was no way to concentrate beryl ores so there was no reason to sample the ore. From samples that are available, i.e. Hinrichs report and the samples assayed by the Bureau of Mines, it appears that a number of the dikes contain from 0.5% BeO to 1.0% BeO in the form of beryl.

Although complete geologic information is not available, it must be realized that beryllium has only recently become of major importance as a metal and that suitable metallurgical methods for concentrating the ore were developed only within the last three years; thus previous to the present time there was little incentive for developing beryl mines.

23.

(a)	6 miners @ $300.00	$7200.00
	1 cook @ $225.00	900.00
(b)	1 surveyor @ $500.00	2000.00
	1 geologist @ $500.00	2000.00
	1 consultant @ $750.00	3000.00
(c)	None	
(d)	Road Construction	5000.00
	Construction of bunk house and cook shack	5000.00
(e)	210 compressor	6000.00
	Air and water hose	500.00
	2 - 55 jackhammers	750.00
	2 - Bars and shells	670.00
	Rail and pipe	3000.00
	1/2 Ton pickup truck	2000.00
	Dynamite	1500.00
	Drill steel and bits	1000.00
	Timber	640.00
	Nails, wedges, spikes	50.00
(f)	None	

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

(g)	Transit $25.00/month	$ 100.00
	Aledaide $25.00/month	100.00
(h)	Hammers, axes, double jacks, jim crow, miscellaneous	250.00
(i)	Fuel - Gas and oil	1000.00
	Assays 500 @ $10.00	5000.00
	Metallurgical Report	1500.00
		$49140.00

24. First Month Expenses

Salaries	$ 3775.00
Equipment & Supplies	13,570.00
Assays	2000.00
Road Building	2500.00
Bunk house and cook shack	5000.00
	$ 25845.00

Compressor	$ 6000.00
Air & water hose	500.00
Jackhammers	730.00
Column, arm and shell	670.00
Rail and pipe	1500.00
Powder	750.00
Bits and steel	500.00
Timber	320.00
Wedges	50.00
Rent on Surveying instruments	50.00
Hammers, axes, double jacks, jim crow	250.00
Fuel	250.00
Total Equipment and supplies	$ 13570.00

Second Month

Salaries and wages	$ 3775.00
Road Building	2500.00
Rent on instruments	50.00
Fuel	250.00
Assays	2000.00
Metallurgical Reports	750.00
	$ 9325.00

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

Third Month

Salaries and wages	$ 3775.00
Rail and pipe	1500.00
Powder	750.00
Bits and steel	500.00
Timber	320.00
Rent on instruments	50.00
Fuel	250.00
Assays	500.00
	7645.00

Fourth Month

Salaries and wages	$ 3775.00
Rent on instruments	50.00
Fuel	250.00
Metallurgical reports	750.00
Assays	500.00
	$ 5325.00

First Month

Survey claims. Make topographic map and geology map. Sample dikes. Purchase compressor, jackhammers, powder, 1/2 ton pick-up truck. Build bunk house and cook shack. Build roads.

Second Month

Complete maps and sampling of claims. Send ore in for additional metallurgical tests. Start drifts on promising dikes.

Third Month

Continue drifts on promising dikes. Sample dikes on open ground around claims.

Fourth Month

Complete underground work. Complete sampling. Compute tonnage and grade of ore. Begin plans for mill. Complete metallurgical investigations.

Form MF-100
(March 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Form approved.
Budget Bureau No. 42-R1026.

GENERAL TECHNICAL DATA
FOR USE UNDER THE
DEFENSE PRODUCTION ACT OF 1950

NOT TO BE FILLED IN BY APPLICANT

Docket No. dma 1401

Date received 5/24/51

William A. Reinken
Robert C. Horton
252 West First Street
Reno, Nevada

Name and address of applicant

Date April 25, 1951

INSTRUCTIONS

This form is to be filed with Defense Minerals Administration, Department of the Interior, Washington 25, D. C. It should be accompanied by appropriate application form when a specific type of Government assistance is requested, in the form of (1) loan, (2) purchase contract, (3) Government guarantee of a private loan, (4) Necessity Certificate pursuant to the provisions of Sec. 124-A (Amortization Deduction) of Internal Revenue Code, 1950, (5) priorities or allocation of mining equipment, and maintenance, repair and operating supplies, and (6) other forms of Government assistance that might arise under the Act. Submit four (4) signed copies of the form and accompanying papers. Name and address should be stamped or typed on each sheet of this form and all accompanying papers. *When a question is inapplicable it should be so stated on the form.* Additional sheets may be attached in answering any questions or in supplying additional information. (IF YOU CANNOT ANSWER A QUESTION, SO STATE.) If a question is answered elsewhere indicate where answered. It is not necessary to answer it again.

GENERAL TECHNICAL DATA

Supply the following information on separate sheets, arranged, numbered, and lettered as indicated:

1. Materials produced:
   (*a*) What are the chief mine, mill, or smelter products?
   (*b*) What are the byproducts, if any?
2. Name(s) and type(s) of mine(s), mill(s), smelter(s), refinery(ies), pit(s), quarry (ies), drilling operation(s). Include old names of property, if any. Show extent of workings, including the following:
   (*a*) Linear feet of shafts.
   (*b*) Linear feet of drifts and crosscuts.
   (*c*) Linear feet of tunnels or adits.
   (*d*) Linear feet of other mine openings (explain briefly).

   Indicate whether mine is flooded or not. Describe any pumping problems. Give size or productive capacity.
3. For each operation listed above supply the following:
   (*a*) Distance and direction from nearest town and shipping point.
   (*b*) Mining district.
   (*c*) Township, Section, Range.
   (*d*) County, State.
4. (*a*) State whether or not property is now in operation, and if in operation, by whom operated.
   (*b*) Are you operating this property as:
   - ☐ Owner.
   - ☒ Lessee.
   - ☐ Contractor.
5. Number of years in production None

   If not in production or operation, estimated date when production will begin cannot be answered
6. Experience of operators:

   Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who manage the project.
7. History:
   (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for suspension of operation.
   (*b*) State briefly the known history and production of adjoining and neighboring properties.
   (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

8. Names and addresses of Officers, Directors, or Partners, and in addition thereto, the five largest stockholders if applicant is a corporation.

Name and Address (a)	Official Title (If officer is also director indicate by "D") (b)	Total of Annual Salary, Commissions, Bonuses, Etc., Received From Applicant and Affiliates During Last Fiscal Year (c)	Estimated Net Worth Outside of Interest in Applicant (d)	Number of Shares Held in Applicant Corporation: Common (e)	Number of Shares Held in Applicant Corporation: Preferred (f)	Life Insurance Carried for Benefit of Applicant: Amount (g)	Life Insurance Carried for Benefit of Applicant: Net Cash Surrender Value After Loans (h)
William A. Reinken	Partner						
252 W. First St.							
Reno, Nevada							
Robert C. Horton	Partner						
252 W. First St.							
Reno, Nevada							
	Total		x x x x x			x x x x x	x x x x x

If more lines are needed continue on separate sheet.

9. Capital Stock Issues:

For Corporate Applicants

Item	Authorized (a)	Outstanding (b)	Par Value (c)	Number of Shares Outstanding (d)	Dividend Rate Last Paid* (e)
Common stock	$	$	$		
Preferred stock	$	$	$		

*Indicate period covered.

10. Production:

Item*	Kind of Product (a)	1948 Total (b)	1949 Total (c)	1950 Total (d)	Present Average Monthly (e)
1. Quantity of product mined or quarried (Short, long, metric tons; barrels; pounds; etc.)	Beryl	No records of production			
2. Quantity of product processed (specify unit of measure and type of process)		No present production			
3. Quantity and grade of product sold or shipped (specify units of measure)					

11. Do you contemplate a change in the present average monthly rate of production? If so, state estimated maximum monthly production and basis of change.

12. Ore or Mineral Reserves:

(a) Describe the ore or mineral deposit briefly. Accompany the application by any available report on the geology and ore reserves.

(*b*) If deposit is other than placer:

(1) Submit assay plans and/or sections showing location and size of proved (measured) and probable (indicated) ore or mineral reserve.

(2) State the tonnage (indicate type of ton) and grade of each class of ore reserve, as above, and show how computed. Tabulated total ore reserve as follows:

TOTAL ORE OR MINERAL RESERVES

Ore or Mineral Reserve	Estimated Tons (a)	Metal or Mineral Content Per Ton (Grade) (b)	Gross Value Per Ton (c)	Recoverable Unit Value Per Ton (d)	Estimated Cost of Production Per Ton (e)
Measured (proved)					
Indicated (probable)	Unknown	0.5%-1.0%	$14-$28	0.40% - 0.80%	Unknown

(*c*) If placer:

(1) Give estimated total yardage and average marketable mineral content of each deposit.

(2) Submit map showing location of placer deposit and surrounding area, with all test holes or pits. Submit logs of each hole and test pit with depth and average value of each.

(3) Describe gravel, stating whether fine, medium or coarse; loose, tight, cemented, or frozen, and whether it contains stumps or boulders more than 1 foot in diameter; if so, how large, and in what proportion.

(4) Describe bedrock, giving type (granite, sandstone, shale, etc.) and state whether it is hard or soft, smooth, uneven or rough.

(5) Describe overburden, stating whether loose, tight, or cemented; fine or coarse textured; furnish estimate of average thickness and total amount.

(6) Tabulate the reserves using the form outlined above for ore or mineral reserves.

13. Access Roads:

Give road distances to shipping, supply and residence points, stating kind and condition of roads.

14. Water Supply:

State source and quantity of water available for operations and whether sufficient for all seasons of year.

15. Power:

State amount of power used, rate per hour, and source thereof.

16. Labor:

State number and classes (miners, muckers, millmen, etc.) of men employed during a recent representative payroll period.

17. Equipment and Facilities:

Describe present equipment on the property, including buildings. (State condition.) List major pieces of equipment now owned or controlled and in serviceable condition available for this operation.

18. Are there any particular conditions or circumstances affecting your operations that are not described above? If so, explain.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

- - -
(Name of company)

By Robert C. Horton
(Signature of authorized official)

April 25, 1951
(Date)

President
(Title)

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—63792-1

ITEM 6. (b)

SCHRADER, Erich Julius, Cons. Min. Engineer, P.O. Box 244, Reno, Nevada and 19 Sierra St., Reno, Nevada; res. Colonial Apts.
Mining Engr.; b. Bremen, Ger., June 24, 1881; s. Ernst (Dr. Jur.) and Josephine (von Groning) Schrader; ed. pvt. sch. in Ger. and pub. schs., St. Paul and Minneapolis, Minn.; Univ. of Minn., E.M., 1905; mem. Theta Tau. Various positions, U.S. and Mexico, 1905-12; Gen. Mgr., Spanish Belt Mine, Tonopah, Nev., 1918-21; Cons. work, Hammon Eng. Co. & Tonopah Min. Co., of Nev., 1922-28; Gen. Supt., Gold Circle Cons., Midas, Nev., 1928-29; Asst. Gen. Mgr., Seven Troughs Gold Mines Co., 1920-30, cons. engr., Weepah, Nevada Mining Co., and others, 1930 to date. Mem. State Mining Advisory Bd., 1944 to date. Specialized in the cyanidation of gold and silver ores and mine mgmt. Author: Lane Mill Data (Min. & Sci. Press, Vol. 107); The Rockland Mines (E. & M. J., Vol. 99); and other contbns. to tech. press. Mem A. I. M. E. Rep. Prot.

Ref: Who is Who in Engineering, 1948

William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

1. (a) Beryl concentrates
   (b) Ruby mica (muscovite)

2. (a, b, c, d) No underground workings of any extent.

3. (a) 56 miles from Tobar, Nevada - Western Pacific Railroad;
   65 miles from Wells, Nevada - Southern Pacific Railroad and Western Pacific Railroad;
   65 miles from Elko, Nevada - Southern Pacific Railroad and Western Pacific Railroad.

   (b) Unnamed mining district in the Ruby-East Humboldt Range.
   (c) Township 29 North, Range 58 East, Mount Diablo Base Meridian.
   (d) Elko County, Nevada.

4. (a) Property is not in operation.

6. William A. Reinken: Geological Engineer. One year as geologist with U. S. Geological Survey. Registered Professional Engineer. At present with the United Engineers, Reno, Nevada.

   Robert C. Horton: Geological Engineer. One year as geologist with U. S. Geological Survey. At present consulting geologist with the United Engineers, Reno, Nevada.

   (b) Erich Schrader: Consulting engineer for the project. See attached sheet for qualifications.

7. (a) The property has been worked only as a mica mine. The production has been small and no records were kept. A small amount of beryl, hand picked, has also been shipped. There are no records of these shipments.
   (b) There are no adjoining mines other than small prospects.
   (c) At the present time we are sampling some of the dikes, but the results are not yet available. A geological report and map by E. Neal Hinrichs of the U. S. Geological Survey and a metallurgical report on work done by the U. S. Bureau of Mines on samples from the Errington-Theil property in the Ruby Mountains are attached.

12. (a) See attached Hinrichs report. At the present time insufficient work has been done to allow an accurate estimate of the tonnage or grade of ore that could be mined.

13. Nevada State Highway No. 11 is located on the eastern boundary of the property. The road is a secondary gravel road, but is in good condition. Tobar, the shipping point, is 56 miles from the mine. This road is in good shape. Wells, Nevada, is 65 miles and Elko, Nevada, 65 miles from the property. The roads to both Wells and Elko are part gravel and part asphalt.

14. Sufficient water is available from mountain streams. Underground water may be developed by shallow drilling. The amount of water available is more than ample for all operations.

15. The only power needed at the present time is for the operation of a compressor. The compressor, however, will be a portable unit, complete with power unit. If the property warrants building a mill, power will be supplied by diesel generators at the property.

16. This is a new operation, so no past payroll records are available.

17. There is no equipment on the property at the present time.

18. Within recent years considerable research has been done on the concentration of beryl ores. Only recently have these techniques been perfected and, with their perfection, it is now prudent that promising beryl properties be investigated. Because of the previous low prices and high cost of beryl production, it should not be expected that any considerable amount of exploration and development work has been done on such properties.

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dma 11018

Date received 5/21/51

Participation

William A. Reinken
Robert C. Horton
252 West First Street
Reno, Nevada

Name and address of applicant

Date April 25, 1951

FILL IN THIS BLOCK

Date of application April 25, 1951

Estimated cost $49,140

Mineral or metal Beryl and Mica

Percentage of Government participation 90%

Location of mine Elko County, Nevada

Date of filing MF-100 April 25, 1951

DMA Docket Number, if available dma 1101

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

    NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.

*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.

*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.

*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.

15. State in detail how the ore could be shipped and how and where milled.

*16. History:
    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.
    (*b*) State briefly the known history and production of adjoining and neighboring properties.
    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

*17. Production:
    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)
    (*a*) Describe the ore or mineral deposits briefly.
    (*b*) Submit available maps and assay data.
    (*c*) Give estimated tonnage and grade of each class of ore reserves.

19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?

21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.

22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
    (*b*) Supervisors, by numbers and positions, with salaries of each.
    (*c*) Cost of necessary repairs to existing facilities, structures, and buildings.
    (*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.
    (*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.
    (*f*) Cost of rental for equipment which the operator proposes to rent.
    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.
    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.
    (*i*) Cost of power, water, utilities, and any other items not provided for above.

24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

- - -

(Name of company)

By [signature] (Signature of authorized official)

April 25, 1951

(Date)

[signature] (Title)

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

1. thru 5. Answered on MF-100

6. No claims, liens, or encumbrances are against the property.

7. A copy of the lease, which is in good standing, is attached.

8. This being a new venture, no financial statement is available.

9. We are prepared to invest $5,000, which is sufficient to pay our share of the costs of exploration in accordance with the regulations on Government participation.

10. (a) The property is located in the Ruby Mountains, Elko, County, Nevada, and more particularly, in Township 29 North, Range 58 East, Mount Diablo Base and Meridian. There are no operating mines on or near the property.

    (b) There is no legal description available, as these are unpatented mining claims, The area is described in the attached lease. Both areas in (a) and (b) are the same.

11. thru 14. Answered on MF-100.

15. The ore will be concentrated at the mine. The concentrates will then be hauled to Tobar, on the Western Pacific Railroad, and then shipped to the Beryllium Corporation of America, or to other buyers.

16. thru 18. Answered on MF-100.

19. Any conditions or circumstances not brought out by the foregoing questions have been discussed in form MF-100.

20. The exploration will be conducted in an effort to block out sufficient tonnage of beryl ore to warrant the construction of a mill. Sheet and fine ground ruby mica will also be produced and will allow us to mine a lower grade of beryl ore than if beryl alone were produced.

21. A complete geological map of the area will be made. All the pegmatite dikes which contain beryl will be sampled. Those dikes which appear to contain commercial ore will be sampled in detail. Three or four short drifts will be driven in the richer dikes to determine the character of the ore at depth and to aid in the calculation of the minimum tonnage of beryl ore present.

    In conjunction with the Western Machinery Company and the Western Knapp Engineering Company we will design a mill to treat the ore, providing the results warrant it.

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

This project will take four (4) months.

22. The area was mapped by J. C. Olson, R. E. Burns, and E. N. Hinrichs of the U. S. Geological Survey in 1948. The title of the map is "The Dawley Canyon Pegmatite Area, Ruby Mountains, Elko, County, Nevada." E. N. Hinrichs also compiled a geologic report of a small area, which gives the general geology of the region. The title of his report is "The Pegmatites of the Errington-Thiel Mine, Elko County, Nevada." A copy of the map and report is attached.

Very few samples have been taken at the property. In the past there was no way to concentrate beryl ores so there was no reason to sample the ore. From samples that are available, i.e. Hinrichs report and the samples assayed by the Bureau of Mines, it appears that a number of the dikes contain from 0.5% BeO to 1.0% BeO in the form of beryl.

Although complete geologic information is not available, it must be realized that beryllium has only recently become of major importance as a metal and that suitable metallurgical methods for concentrating the ore were developed only within the last three years; thus previous to the present time there was little incentive for developing beryl mines.

23.

(a)	6 miners @ $300.00	$7200.00
	1 cook @ $225.00	900.00
(b)	1 surveyor @ $500.00	2000.00
	1 geologist @ $500.00	2000.00
	1 consultant @ $750.00	3000.00
(c)	None	
(d)	Road Construction	5000.00
	Construction of bunk house and cook shack	5000.00
(e)	210 compressor	6000.00
	Air and water hose	500.00
	2 - 55 jackhammers	730.00
	2 - Bars and shells	670.00
	Rail and pipe	3000.00
	1/2 Ton pickup truck	2000.00
	Dynamite	1500.00
	Drill steel and bits	1000.00
	Timber	640.00
	Nails, wedges, spikes	50.00
(f)	None	

(g)	Transit $25.00/month	$ 100.00
	Aledaide $25.00/month	100.00
(h)	Hammers, axes, double jacks, jim crow, miscellaneous	250.00
(i)	Fuel - Gas and oil	1000.00
	Assays 500 @ $10.00	5000.00
	Metallurgical Report	1500.00
		$49140.00

24. First Month Expenses

Salaries	$ 3775.00
Equipment & Supplies	13,570.00
Assays	2000.00
Road Building	2500.00
Bunk house and cook shack	5000.00
	$ 26845.00

Compressor	$ 6000.00
Air & water hose	500.00
Jackhammers	730.00
Column, arm and shell	670.00
Rail and pipe	1500.00
Powder	750.00
Bits and steel	500.00
Timber	320.00
Wedges	50.00
Rent on Surveying instruments	50.00
Hammers, axes, double jacks, jim crow	250.00
Fuel	250.00
Total Equipment and supplies	$ 13570.00

Second Month

Salaries and wages	$ 3775.00
Road Building	2500.00
Rent on instruments	50.00
Fuel	250.00
Assays	2000.00
Metallurgical Reports	750.00
	$ 9325.00

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

Third Month

Salaries and wages	$ 3775.00
Rail and pipe	1500.00
Powder	750.00
Bits and steel	500.00
Timber	320.00
Rent on instruments	50.00
Fuel	250.00
Assays	500.00
	7645.00

Fourth Month

Salaries and wages	$ 3775.00
Rent on instruments	50.00
Fuel	250.00
Metallurgical reports	750.00
Assays	500.00
	$ 5325.00

First Month

Survey claims. Make topographic map and geology map. Sample dikes. Purchase compressor, jackhammers, powder, 1/2 ton pick-up truck. Build bunk house and cook shack. Build roads.

Second Month

Complete maps and sampling of claims. Send ore in for additional metallurgical tests. Start drifts on promising dikes.

Third Month

Continue drifts on promising dikes. Sample dikes on open ground around claims.

Fourth Month

Complete underground work. Complete sampling. Compute tonnage and grade of ore. Begin plans for mill. Complete metallurgical investigations.

Form MF-100
(March 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Form approved.
Budget Bureau No. 42-R1026.

GENERAL TECHNICAL DATA FOR USE UNDER THE DEFENSE PRODUCTION ACT OF 1950

NOT TO BE FILLED IN BY APPLICANT

Docket No. Sma 1101

Date received 5-2-51

William A. Reinken
Robert C. Horton
852 West First Street
Reno, Nevada

Name and address of applicant

Date April 25, 1951

INSTRUCTIONS

This form is to be filed with Defense Minerals Administration, Department of the Interior, Washington 25, D. C. It should be accompanied by appropriate application form when a specific type of Government assistance is requested, in the form of (1) loan, (2) purchase contract, (3) Government guarantee of a private loan, (4) Necessity Certificate pursuant to the provisions of Sec. 124–A (Amortization Deduction) of Internal Revenue Code, 1950, (5) priorities or allocation of mining equipment, and maintenance, repair and operating supplies, and (6) other forms of Government assistance that might arise under the Act. Submit four (4) signed copies of the form and accompanying papers. Name and address should be stamped or typed on each sheet of this form and all accompanying papers. *When a question is inapplicable it should be so stated on the form.* Additional sheets may be attached in answering any questions or in supplying additional information. (IF YOU CANNOT ANSWER A QUESTION, SO STATE.) If a question is answered elsewhere indicate where answered. It is not necessary to answer it again.

GENERAL TECHNICAL DATA

Supply the following information on separate sheets, arranged, numbered, and lettered as indicated:

1. Materials produced:
   (*a*) What are the chief mine, mill, or smelter products?
   (*b*) What are the byproducts, if any?
2. Name(s) and type(s) of mine(s), mill(s), smelter(s), refinery(ies), pit(s), quarry (ies), drilling operation(s). Include old names of property, if any. Show extent of workings, including the following:
   (*a*) Linear feet of shafts.
   (*b*) Linear feet of drifts and crosscuts.
   (*c*) Linear feet of tunnels or adits.
   (*d*) Linear feet of other mine openings (explain briefly).

   Indicate whether mine is flooded or not. Describe any pumping problems. Give size or productive capacity.
3. For each operation listed above supply the following:
   (*a*) Distance and direction from nearest town and shipping point.
   (*b*) Mining district.
   (*c*) Township, Section, Range.
   (*d*) County, State.
4. (*a*) State whether or not property is now in operation, and if in operation, by whom operated.
   (*b*) Are you operating this property as:
   - ☐ Owner.
   - ☒ Lessee.
   - ☐ Contractor.
5. Number of years in production None
   If not in production or operation, estimated date when production will begin cannot be answered
6. Experience of operators:
   Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who manage the project.
7. History:
   (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for suspension of operation.
   (*b*) State briefly the known history and production of adjoining and neighboring properties.
   (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

8. Names and addresses of Officers, Directors, or Partners, and in addition thereto, the five largest stockholders if applicant is a corporation.

Name and Address (a)	Official Title (If officer is also director indicate by "D") (b)	Total of Annual Salary, Commissions, Bonuses, Etc., Received From Applicant and Affiliates During Last Fiscal Year (c)	Estimated Net Worth Outside of Interest in Applicant (d)	Number of Shares Held in Applicant Corporation: Common (e)	Number of Shares Held in Applicant Corporation: Preferred (f)	Life Insurance Carried for Benefit of Applicant: Amount (g)	Life Insurance Carried for Benefit of Applicant: Net Cash Surrender Value After Loans (h)
William A. Reinken	Partner						
252 W. First St.							
Reno, Nevada							
Robert C. Horton	Partner						
252 W. First St.							
Reno, Nevada							
	Total		x x x x x			x x x x x	x x x x x

If more lines are needed continue on separate sheet.

9. Capital Stock Issues:

For Corporate Applicants

Item	Authorized (a)	Outstanding (b)	Par Value (c)	Number of Shares Outstanding (d)	Dividend Rate Last Paid* (e)
Common stock	$	$	$		
Preferred stock	$	$	$		

*Indicate period covered.

10. Production:

Item	Kind of Product (a)	1948 Total (b)	1949 Total (c)	1950 Total (d)	Present Average Monthly (e)
1. Quantity of product mined or quarried (Short, long, metric tons; barrels; pounds; etc.)	Beryl	No records of production			
2. Quantity of product processed (specify unit of measure and type of process)		No present production			
3. Quantity and grade of product sold or shipped (specify units of measure)					

11. Do you contemplate a change in the present average monthly rate of production? If so, state estimated maximum monthly production and basis of change.

12. Ore or Mineral Reserves:

(a) Describe the ore or mineral deposit briefly. Accompany the application by any available report on the geology and ore reserves.

(*b*) If deposit is other than placer:

(1) Submit assay plans and/or sections showing location and size of proved (measured) and probable (indicated) ore or mineral reserve.

(2) State the tonnage (indicate type of ton) and grade of each class of ore reserve, as above, and show how computed. Tabulated total ore reserve as follows:

TOTAL ORE OR MINERAL RESERVES

Ore or Mineral Reserve	Estimated Tons (a)	Metal or Mineral Content Per Ton (Grade) (b)	Gross Value Per Ton (c)	Recoverable Unit Value Per Ton (d)	Estimated Cost of Production Per Ton (e)
Measured (proved)					
Indicated (probable)	Unknown	0.5%-1.0%	$14-$28	0.40% - 0.80%	Unknown

(*c*) If placer:

(1) Give estimated total yardage and average marketable mineral content of each deposit.

(2) Submit map showing location of placer deposit and surrounding area, with all test holes or pits. Submit logs of each hole and test pit with depth and average value of each.

(3) Describe gravel, stating whether fine, medium or coarse; loose, tight, cemented, or frozen, and whether it contains stumps or boulders more than 1 foot in diameter; if so, how large, and in what proportion.

(4) Describe bedrock, giving type (granite, sandstone, shale, etc.) and state whether it is hard or soft, smooth, uneven or rough.

(5) Describe overburden, stating whether loose, tight, or cemented; fine or coarse textured; furnish estimate of average thickness and total amount.

(6) Tabulate the reserves using the form outlined above for ore or mineral reserves.

13. Access Roads:

Give road distances to shipping, supply and residence points, stating kind and condition of roads.

14. Water Supply:

State source and quantity of water available for operations and whether sufficient for all seasons of year.

15. Power:

State amount of power used, rate per hour, and source thereof.

16. Labor:

State number and classes (miners, muckers, millmen, etc.) of men employed during a recent representative payroll period.

17. Equipment and Facilities:

Describe present equipment on the property, including buildings. (State condition.) List major pieces of equipment now owned or controlled and in serviceable condition available for this operation.

18. Are there any particular conditions or circumstances affecting your operations that are not described above? If so, explain.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

- - -
(Name of company)

By Robert C. Horton
(Signature of authorized official)

April 25, 1951
(Date)

President
(Title)

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—63792-1

ITEM 6. (b)

SCHRADER, Erich Julius, Cons. Min. Engineer, P.O. Box 244, Reno, Nevada and 19 Sierra St., Reno, Nevada; res. Colonial Apts.
Mining Engr.; b. Bremen, Ger., June 24, 1881; s. Ernst (Dr. Jur.) and Josephine (von Groning) Schrader; ed. pvt. sch. in Ger. and pub. schs., St. Paul and Minneapolis, Minn.; Univ. of Minn., B.M., 1905; mem. Theta Tau. Various positions, U.S. and Mexico, 1905-12; Gen. Mgr., Spanish Belt Mine, Tonopah, Nev., 1918-21; Cons. work, Hammon Eng. Co. & Tonopah Min. Co., of Nev., 1922-28; Gen. Supt., Gold Circle Cons., Midas, Nev., 1928-29; Asst. Gen. Mgr., Seven Troughs Gold Mines Co., 1920-30, cons. engr., Weepah, Nevada Mining Co., and others, 1930 to date. Mem. State Mining Advisory Bd., 1944 to date. Specialized in the cyanidation of gold and silver ores and mine mgmt. Author: Lane Mill Data (Min. & Sci. Press, Vol. 107); The Rockland Mines (E. & M. J., Vol. 99); and other contbns. to tech. press. Mem A. I. M. E. Rep. Prot.

Ref: Who is Who in Engineering, 1948

William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

1. (a) Beryl concentrates
   (b) Ruby mica (muscovite)

2. (a, b, c, d) No underground workings of any extent.

3. (a) 56 miles from Tobar, Nevada - Western Pacific Railroad;
   65 miles from Wells, Nevada - Southern Pacific Railroad and Western Pacific Railroad;
   65 miles from Elko, Nevada - Southern Pacific Railroad and Western Pacific Railroad.

   (b) Unnamed mining district in the Ruby-East Humboldt Range.
   (c) Township 29 North, Range 58 East, Mount Diablo Base Meridian.
   (d) Elko County, Nevada.

4. (a) Property is not in operation.

6. William A. Reinken: Geological Engineer. One year as geologist with U. S. Geological Survey. Registered Professional Engineer. At present with the United Engineers, Reno, Nevada.

   Robert C. Horton: Geological Engineer. One year as geologist with U. S. Geological Survey. At present consulting geologist with the United Engineers, Reno, Nevada.

   (b) Erich Schrader: Consulting engineer for the project. See attached sheet for qualifications.

7. (a) The property has been worked only as a mica mine. The production has been small and no records were kept. A small amount of beryl, hand picked, has also been shipped. There are no records of these shipments.
   (b) There are no adjoining mines other than small prospects.
   (c) At the present time we are sampling some of the dikes, but the results are not yet available. A geological report and map by E. Neal Hinrichs of the U. S. Geological Survey and a metallurgical report on work done by the U. S. Bureau of Mines on samples from the Errington-Theil property in the Ruby Mountains are attached.

12. (a) See attached Hinrichs report. At the present time insufficient work has been done to allow an accurate estimate of the tonnage or grade of ore that could be mined.

13. Nevada State Highway No. 11 is located on the eastern boundary of the property. The road is a secondary gravel road, but is in good condition. Tobar, the shipping point, is 56 miles from the mine. This road is in good shape. Wells, Nevada, is 65 miles and Elko, Nevada, 65 miles from the property. The roads to both Wells and Elko are part gravel and part asphalt.

14. Sufficient water is available from mountain streams. Underground water may be developed by shallow drilling. The amount of water available is more than ample for all operations.

15. The only power needed at the present time is for the operation of a compressor. The compressor, however, will be a portable unit, complete with power unit. If the property warrants building a mill, power will be supplied by diesel generators at the property.

16. This is a new operation, so no past payroll records are available.

17. There is no equipment on the property at the present time.

18. Within recent years considerable research has been done on the concentration of beryl ores. Only recently have these techniques been perfected and, with their perfection, it is now prudent that promising beryl properties be investigated. Because of the previous low prices and high cost of beryl production, it should not be expected that any considerable amount of exploration and development work has been done on such properties.

W.M.M.
Nev-60
October 1942

WAR MINERALS MEMORANDUM[1]

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

Report of the Bureau of Mines to Hon. Harold L. Ickes,
Secretary of the Interior

ERRINGTON MICA-BERYL PROPERTY
Elko County, Nevada

-Mica-Beryl-

Summary

The Errington mica-beryl property has had little development and no production. The character and quality of the muscovite block mica so far exposed is for the most part nonstrategic and not commercial. The property's isolation from markets is a serious handicap.

An apparently large tonnage of mica schist, occurring in the walls of the largest of the pegmatite dikes, is not suitable for marketing as ground mica.

The beryl content of the pegmatite is too small to justify any attempt at further development.

No further consideration by the Bureau is recommended.

1/ These memoranda present the facts reported by Bureau of Mines engineers regarding properties for which no further consideration is recommended. Therefore, they should be treated as confidential, for the sole use of Bureau employees. They should not be given out to the public or to the owners of the properties concerned.

Introduction

Errington's mica-beryl property in the Ruby Range, Elko County, Nevada, was examined in October 1942 by an engineer of the Bureau of Mines. This property is about 65 miles southwesterly from Wells, Nevada. The route from Wells is by U. S. Highway No. 93, 25 miles south to Warm Creek Ranch, thence by Ruby Valley graveled road southwest 40 miles to the property.

History

The Errington property includes 35 claims owned by Mrs. A. T. Errington and five claims owned by Elizabeth Shaffer. The five Shaffer claims and six of the Errington group were acquired from H. R. Castle of Elko. M. W. Young also is said to own an interest in the Errington claims. Excepting those obtained from H. R. Castle, all were located in 1931.

Physical Features

The Ruby Range is a rugged, granitic chain of mountains, some of which rise to elevations above 10,000 feet. The Errington property lies on the east slope of the Range, and varies in elevation from 6000 to approximately 9000 feet.

Description of the Deposit

Numerous pegmatite dikes occur in granite, striking N. to N. 15 W. The dikes vary in width from 2 to 12 feet or more. Dike minerals are quartz, felspar, block muscovite mica, garnet, magnetite, and a very small amount of beryl. An occasional copper stain was noted. Numerous open cuts have been made on the various dikes. The largest of these, and the most westerly of the number examined, was 12 feet in

width with a vertical face about 10 feet high, exposing block muscovite mica irregularly spaced, and small areas consisting principally of garnet and magnetite, in a gangue of quartz and felspar. About 40 tons of the mica has been removed from this cut and is now stored on the adjacent dump.

The mica crystals in the large cut are as much as 4 by 5 inches, edge dimensions. Some are broken and cracked by the toppling of the dike at the surface, caused by erosion of its walls. The mica shows some cross-grains, hairline and tangle-sheet defects, and some black-spotted-stain was noted. About five percent of the mined mica on the dump of the cut is relatively clear, only slightly smoky, and possibly of commercial value. No other cut on the property shows block mica.

The muscovite mica is of more potential strategic value than the beryl. The dike in which this cut was excavated extrudes through mica schist. The schist apparently extended for at least 20 to 30 feet from the walls of the dike, but its definite extent was obscured by overburden.

The occurrence of beryl in these dikes appears to be exceedingly limited. In a close examination of the faces of ten or twelve cuts in various dikes, the Bureau's engineer obtained only a handful of small beryl crystals. A hand-specimen of the beryl sent to the Salt Lake laboratory was reported by Dr. R. E. Head to be "a good grade of beryl". The property has produced a total of only a few hundred pounds of this mineral, according to statements by the owner and others.

The beryl crystals vary in color from nearly white to light green. Their occurrence in the dikes is so infrequent that it is believed no reasonable ratio of concentration by milling is possible. Perhaps 300 tons or more of dike rock would have to be mined and treated to obtain one ton of beryl.

Sampling

Three samples of mica were taken from the cut in the 12-foot dike and were sent to Oliver Bowles, Chief, Nonmetal Economics Division of the Bureau in Washington, for his appraisal. One sample was taken of the mica schist in the walls of the large dike. His report is:

Sample A. In crude form approximately 20 square inches. Water colored, edges badly cross-grained, slight ruling, slight clay stained, incipient "A" ruling, rather gummy throughout. Utilizable area three square inches for punch, but not economical even at present prices, difficult to split, most suitable for grinding, nonstrategic. Its price range would be from $7.50 to $21.00 per short ton.

Sample B. In crude form about 10 square inches, light rum color, slight ruling, utilizable area (after trimming edges) four square inches. Some hair-lines in the sound area, soft, suitable for punch of No. 2 clear quality, strategic, which commands a price of at least 30 cents per pound, half trimmed, North Carolina method of preparation.

Sample D. Mica schist, (from walls of large dike) muscovite with minor amounts of biotite, by grinding and beneficiation could possibly produce a low value roofing mica, although the biotite content may rule this out. Probably noncommercial.

Sample E. Suitable for grinding although most of the muscovite has been altered to chlorite and would not command the top price. Price range in western United States for similar material, $1.50 to $9.50 per ton, provided market exists within economic transportation range.

Mr. Bowles comments: "Sample B. is the only strategic quality of the lot. Although the crude book was about 10 square inches and after trimming was four square inches, the yield would not be 40 percent but more like five percent, due to large amount of mica skimmings that must be discarded in splitting off to the sound laminae."

No samples were taken of the dikes containing beryl. No more than a few small crystals of beryl were seen in place anywhere on the property.

Conclusions

It is concluded that:

1. Based upon the appraisal of samples by Oliver Bowles, the deposit has little merit as a possible producer of either strategic or commercial grades of mica.

2. Development heretofore done has exposed block mica only in one cut at the surface.

3. Relative inaccessibility of the property, its distance from market, and the extreme inexperience of the owners now attempting to exploit it, are severe handicaps to possible production of even the grades which otherwise might have a market value.

4. Beryl content of the dike material is too small to be mined at a profit. Even if war requirements demanded production of beryl without regard to cost, this property would be unattractive for the reason that as now developed, only limited production could be expected.

No development of this property by the Bureau is recommended.

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dma 1101

Date received 5/2/51

Participation

William A. Reinken
Robert C. Horton
252 West First Street
Reno, Nevada

Name and address of applicant

Date April 25, 1951

FILL IN THIS BLOCK

Date of application April 25, 1951

Estimated cost $49,140

Mineral or metal Beryl and Mica

Percentage of Government participation 90%

Location of mine Elko County, Nevada

Date of filing MF-100 April 25, 1951

DMA Docket Number, if available dma 1101

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

    NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.

*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.

*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.

*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.

15. State in detail how the ore could be shipped and how and where milled.

*16. History:
    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.
    (*b*) State briefly the known history and production of adjoining and neighboring properties.
    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

*17. Production:
    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)
    (*a*) Describe the ore or mineral deposits briefly.
    (*b*) Submit available maps and assay data.
    (*c*) Give estimated tonnage and grade of each class of ore reserves.

19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?

21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.

22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
    (*b*) Supervisors, by numbers and positions, with salaries of each.
    (*c*) Cost of necessary repairs to existing facilities, structures, and buildings.
    (*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.
    (*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.
    (*f*) Cost of rental for equipment which the operator proposes to rent.
    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.
    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.
    (*i*) Cost of power, water, utilities, and any other items not provided for above.

24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

(Name of company)

By Robert C. Porter
(Signature of authorized official)

April 25, 1951
(Date)

William A. Reinken
(Title)

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

1. thru 5. Answered on MF-100

6. No claims, liens, or encumbrances are against the property.

7. A copy of the lease, which is in good standing, is attached.

8. This being a new venture, no financial statement is available.

9. We are prepared to invest $5,000, which is sufficient to pay our share of the costs of exploration in accordance with the regulations on Government participation.

10. (a) The property is located in the Ruby Mountains, Elko, County, Nevada, and more particularly, in Township 29 North, Range 58 East, Mount Diablo Base and Meridian. There are no operating mines on or near the property.

(b) There is no legal description available, as these are unpatented mining claims. The area is described in the attached lease. Both areas in (a) and (b) are the same.

11. thru 14. Answered on MF-100.

15. The ore will be concentrated at the mine. The concentrates will then be hauled to Tobar, on the Western Pacific Railroad, and then shipped to the Beryllium Corporation of America, or to other buyers.

16. thru 18. Answered on MF-100.

19. Any conditions or circumstances not brought out by the foregoing questions have been discussed in form MF-100.

20. The exploration will be conducted in an effort to block out sufficient tonnage of beryl ore to warrant the construction of a mill. Sheet and fine ground ruby mica will also be produced and will allow us to mine a lower grade of beryl ore than if beryl alone were produced.

21. A complete geological map of the area will be made. All the pegmatite dikes which contain beryl will be sampled. Those dikes which appear to contain commercial ore will be sampled in detail. Three or four short drifts will be driven in the richer dikes to determine the character of the ore at depth and to aid in the calculation of the minimum tonnage of beryl ore present.

In conjunction with the Western Machinery Company and the Western Knapp Engineering Company we will design a mill to treat the ore, providing the results warrant it.

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

This project will take four (4) months.

22. The area was mapped by J. C. Olson, R. E. Burns, and E. N. Hinrichs of the U. S. Geological Survey in 1948. The title of the map is "The Dawley Canyon Pegmatite Area, Ruby Mountains, Elko, County, Nevada." E. N. Hinrichs also compiled a geologic report of a small area, which gives the general geology of the region. The title of his report is "The Pegmatites of the Errington-Thiel Mine, Elko County, Nevada." A copy of the map and report is attached.

Very few samples have been taken at the property. In the past there was no way to concentrate beryl ores so there was no reason to sample the ore. From samples that are available, i.e. Hinrichs report and the samples assayed by the Bureau of Mines, it appears that a number of the dikes contain from 0.5% BeO to 1.0% BeO in the form of beryl.

Although complete geologic information is not available, it must be realized that beryllium has only recently become of major importance as a metal and that suitable metallurgical methods for concentrating the ore were developed only within the last three years; thus previous to the present time there was little incentive for developing beryl mines.

23. (a) 6 miners @ $300.00 — $7200.00
1 cook @ $225.00 — 900.00

(b) 1 surveyor @ $500.00 — 2000.00
1 geologist @ $500.00 — 2000.00
1 consultant @ $750.00 — 3000.00

(c) None

(d) Road Construction — 5000.00
Construction of bunk house and cook shack — 5000.00

(e) 210 compressor — 6000.00
Air and water hose — 500.00
2 - 55 jackhammers — 750.00
2 - Bars and shells — 670.00
Rail and pipe — 3000.00
1/2 Ton pickup truck — 2000.00
Dynamite — 1500.00
Drill steel and bits — 1000.00
Timber — 640.00
Nails, wedges, spikes — 50.00

(f) None

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

(g)	Transit $25.00/month	$ 100.00
	Aledaide $25.00/month	100.00
(h)	Hammers, axes, double jacks, jim crow, miscellaneous	250.00
(i)	Fuel - Gas and oil	1000.00
	Assays 500 @ $10.00	5000.00
	Metallurgical Report	1500.00
		$49140.00

24. First Month Expenses

Salaries	$ 3775.00
Equipment & Supplies	13,570.00
Assays	2000.00
Road Building	2500.00
Bunk house and cook shack	5000.00
	$ 26845.00

Compressor	$ 6000.00
Air & water hose	500.00
Jackhammers	750.00
Column, arm and shell	670.00
Rail and pipe	1500.00
Powder	750.00
Bits and steel	500.00
Timber	320.00
Wedges	50.00
Rent on Surveying instruments	50.00
Hammers, axes, double jacks, jim crow	250.00
Fuel	250.00
Total Equipment and supplies	$ 13570.00

Second Month

Salaries and wages	$ 3775.00
Road Building	2500.00
Rent on instruments	50.00
Fuel	250.00
Assays	2000.00
Metallurgical Reports	750.00
	$ 9325.00

Form MF-103
William A. Reinken, Robert C. Norton
252 West First Street, Reno, Nevada

Third Month

Salaries and wages	$ 3775.00
Rail and pipe	1500.00
Powder	750.00
Bits and steel	500.00
Timber	320.00
Rent on instruments	50.00
Fuel	250.00
Assays	500.00
	7645.00

Fourth Month

Salaries and wages	$ 3775.00
Rent on instruments	50.00
Fuel	250.00
Metallurgical reports	750.00
Assays	500.00
	$ 5325.00

First Month

Survey claims. Make topographic map and geology map. Sample dikes. Purchase compressor, jackhammers, powder, 1/2 ton pick-up truck. Build bunk house and cook shack. Build roads.

Second Month

Complete maps and sampling of claims. Send ore in for additional metallurgical tests. Start drifts on promising dikes.

Third Month

Continue drifts on promising dikes. Sample dikes on open ground around claims.

Fourth Month

Complete underground work. Complete sampling. Compute tonnage and grade of ore. Begin plans for mill. Complete metallurgical investigations.

Form MF-100
(March 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Form approved.
Budget Bureau No. 42-R1026.

GENERAL TECHNICAL DATA
FOR USE UNDER THE
DEFENSE PRODUCTION ACT OF 1950

NOT TO BE FILLED IN BY APPLICANT

Docket No. dma 1101

Date received 5/21/51

William A. Reinken
Robert C. Horton
252 West First Street
Reno, Nevada

Name and address of applicant

Date April 25, 1951

INSTRUCTIONS

This form is to be filed with Defense Minerals Administration, Department of the Interior, Washington 25, D. C. It should be accompanied by appropriate application form when a specific type of Government assistance is requested, in the form of (1) loan, (2) purchase contract, (3) Government guarantee of a private loan, (4) Necessity Certificate pursuant to the provisions of Sec. 124–A (Amortization Deduction) of Internal Revenue Code, 1950, (5) priorities or allocation of mining equipment, and maintenance, repair and operating supplies, and (6) other forms of Government assistance that might arise under the Act. Submit four (4) signed copies of the form and accompanying papers. Name and address should be stamped or typed on each sheet of this form and all accompanying papers. *When a question is inapplicable it should be so stated on the form.* Additional sheets may be attached in answering any questions or in supplying additional information. (IF YOU CANNOT ANSWER A QUESTION, SO STATE.) If a question is answered elsewhere indicate where answered. It is not necessary to answer it again.

GENERAL TECHNICAL DATA

Supply the following information on separate sheets, arranged, numbered, and lettered as indicated:

1. Materials produced:
   (*a*) What are the chief mine, mill, or smelter products?
   (*b*) What are the byproducts, if any?
2. Name(s) and type(s) of mine(s), mill(s), smelter(s), refinery(ies), pit(s), quarry (ies), drilling operation(s). Include old names of property, if any. Show extent of workings, including the following:
   (*a*) Linear feet of shafts.
   (*b*) Linear feet of drifts and crosscuts.
   (*c*) Linear feet of tunnels or adits.
   (*d*) Linear feet of other mine openings (explain briefly).

   Indicate whether mine is flooded or not. Describe any pumping problems. Give size or productive capacity.
3. For each operation listed above supply the following:
   (*a*) Distance and direction from nearest town and shipping point.
   (*b*) Mining district.
   (*c*) Township, Section, Range.
   (*d*) County, State.
4. (*a*) State whether or not property is now in operation, and if in operation, by whom operated.
   (*b*) Are you operating this property as:
   - ☐ Owner.
   - ☒ Lessee.
   - ☐ Contractor.
5. Number of years in production None

   If not in production or operation, estimated date when production will begin cannot be answered
6. Experience of operators:

   Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who manage the project.
7. History:
   (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for suspension of operation.
   (*b*) State briefly the known history and production of adjoining and neighboring properties.
   (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

8. Names and addresses of Officers, Directors, or Partners, and in addition thereto, the five largest stockholders if applicant is a corporation.

Name and Address (a)	Official Title (If officer is also director indicate by "D") (b)	Total of Annual Salary, Commissions, Bonuses, Etc., Received From Applicant and Affiliates During Last Fiscal Year (c)	Estimated Net Worth Outside of Interest in Applicant (d)	Number of Shares Held in Applicant Corporation		Life Insurance Carried for Benefit of Applicant	
				Common (e)	Preferred (f)	Amount (g)	Net Cash Surrender Value After Loans (h)
William A. Reinken	Partner						
252 W. First St.							
Reno, Nevada							
Robert C. Horton	Partner						
252 W. First St.							
Reno, Nevada							
	Total		x x x x x			x x x x x	x x x x x

If more lines are needed continue on separate sheet.

9. Capital Stock Issues:

For Corporate Applicants

Item	Authorized (a)	Outstanding (b)	Par Value (c)	Number of Shares Outstanding (d)	Dividend Rate Last Paid* (e)
Common stock	$	$	$		
Preferred stock	$	$	$		

*Indicate period covered.

10. Production:

Item	Kind of Product (a)	1948 Total (b)	1949 Total (c)	1950 Total (d)	Present Average Monthly (e)
1. Quantity of product mined or quarried (Short, long, metric tons; barrels; pounds; etc.)	Beryl	No records of production			
2. Quantity of product processed (specify unit of measure and type of process)		No present production			
3. Quantity and grade of product sold or shipped (specify units of measure)					

11. Do you contemplate a change in the present average monthly rate of production? If so, state estimated maximum monthly production and basis of change.

12. Ore or Mineral Reserves:

(a) Describe the ore or mineral deposit briefly. Accompany the application by any available report on the geology and ore reserves.

(*b*) If deposit is other than placer:

(1) Submit assay plans and/or sections showing location and size of proved (measured) and probable (indicated) ore or mineral reserve.

(2) State the tonnage (indicate type of ton) and grade of each class of ore reserve, as above, and show how computed. Tabulated total ore reserve as follows:

TOTAL ORE OR MINERAL RESERVES

Ore or Mineral Reserve	Estimated Tons (a)	Metal or Mineral Content Per Ton (Grade) (b)	Gross Value Per Ton (c)	Recoverable Unit Value Per Ton (d)	Estimated Cost of Production Per Ton (e)
Measured (proved)					
Indicated (probable)	Unknown	0.5%-1.0%	$14-$28	0.40% - 0.80%	Unknown

(*c*) If placer:

(1) Give estimated total yardage and average marketable mineral content of each deposit.

(2) Submit map showing location of placer deposit and surrounding area, with all test holes or pits. Submit logs of each hole and test pit with depth and average value of each.

(3) Describe gravel, stating whether fine, medium or coarse; loose, tight, cemented, or frozen, and whether it contains stumps or boulders more than 1 foot in diameter; if so, how large, and in what proportion.

(4) Describe bedrock, giving type (granite, sandstone, shale, etc.) and state whether it is hard or soft, smooth, uneven or rough.

(5) Describe overburden, stating whether loose, tight, or cemented; fine or coarse textured; furnish estimate of average thickness and total amount.

(6) Tabulate the reserves using the form outlined above for ore or mineral reserves.

13. Access Roads:

Give road distances to shipping, supply and residence points, stating kind and condition of roads.

14. Water Supply:

State source and quantity of water available for operations and whether sufficient for all seasons of year.

15. Power:

State amount of power used, rate per hour, and source thereof.

16. Labor:

State number and classes (miners, muckers, millmen, etc.) of men employed during a recent representative payroll period.

17. Equipment and Facilities:

Describe present equipment on the property, including buildings. (State condition.) List major pieces of equipment now owned or controlled and in serviceable condition available for this operation.

18. Are there any particular conditions or circumstances affecting your operations that are not described above? If so, explain.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

- - -
(Name of company)

By Robert P. C. Norton
(Signature of authorized official)

April 25, 1951
(Date)

William A. Tenkon
(Title)

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—63792-1

ITEM 6. (b)

SCHRADER, Erich Julius, Cons. Min. Engineer, P.O. Box 244, Reno, Nevada and 19 Sierra St., Reno, Nevada; res. Colonial Apts.
Mining Engr.; b. Bremen, Ger., June 24, 1881; s. Ernst (Dr. Jur.) and Josephine (von Groning) Schrader; ed. pvt. sch. in Ger. and pub. schs., St. Paul and Minneapolis, Minn.; Univ. of Minn., E.M., 1905; mem. Theta Tau. Various positions, U.S. and Mexico, 1905-12; Gen. Mgr., Spanish Belt Mine, Tonopah, Nev., 1918-21; Cons. work, Hammon Eng. Co. & Tonopah Min. Co., of Nev., 1922-28; Gen. Supt., Gold Circle Cons., Midas, Nev., 1928-29; Asst. Gen. Mgr., Seven Troughs Gold Mines Co., 1920-30, cons. engr., Weepah, Nevada Mining Co., and others, 1930 to date. Mem. State Mining Advisory Bd., 1944 to date. Specialized in the cyanidation of gold and silver ores and mine mgmt. Author: Lane Mill Data (Min. & Sci. Press, Vol. 107); The Rockland Mines (E. & M. J., Vol. 99); and other contbns. to tech. press. Mem A. I. M. E. Rep. Prot.

Ref: Who is Who in Engineering, 1948

William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

1. (a) Beryl concentrates
   (b) Ruby mica (muscovite)

2. (a, b, c, d) No underground workings of any extent.

3. (a) 56 miles from Tobar, Nevada - Western Pacific Railroad;
   65 miles from Wells, Nevada - Southern Pacific Railroad and Western Pacific Railroad;
   65 miles from Elko, Nevada - Southern Pacific Railroad and Western Pacific Railroad.

   (b) Unnamed mining district in the Ruby-East Humboldt Range.
   (c) Township 29 North, Range 58 East, Mount Diablo Base Meridian.
   (d) Elko County, Nevada.

4. (a) Property is not in operation.

6. William A. Reinken: Geological Engineer. One year as geologist with U. S. Geological Survey. Registered Professional Engineer. At present with the United Engineers, Reno, Nevada.

   Robert C. Horton: Geological Engineer. One year as geologist with U. S. Geological Survey. At present consulting geologist with the United Engineers, Reno, Nevada.

   (b) Erich Schrader: Consulting engineer for the project. See attached sheet for qualifications.

7. (a) The property has been worked only as a mica mine. The production has been small and no records were kept. A small amount of beryl, hand picked, has also been shipped. There are no records of these shipments.
   (b) There are no adjoining mines other than small prospects.
   (c) At the present time we are sampling some of the dikes, but the results are not yet available. A geological report and map by E. Neal Hinrichs of the U. S. Geological Survey and a metallurgical report on work done by the U. S. Bureau of Mines on samples from the Errington-Theil property in the Ruby Mountains are attached.

12. (a) See attached Hinrichs report. At the present time insufficient work has been done to allow an accurate estimate of the tonnage or grade of ore that could be mined.

13. Nevada State Highway No. 11 is located on the eastern boundary of the property. The road is a secondary gravel road, but is in good condition. Tobar, the shipping point, is 56 miles from the mine. This road is in good shape. Wells, Nevada, is 65 miles and Elko, Nevada, 65 miles from the property. The roads to both Wells and Elko are part gravel and part asphalt.

14. Sufficient water is available from mountain streams. Underground water may be developed by shallow drilling. The amount of water available is more than ample for all operations.

15. The only power needed at the present time is for the operation of a compressor. The compressor, however, will be a portable unit, complete with power unit. If the property warrants building a mill, power will be supplied by diesel generators at the property.

16. This is a new operation, so no past payroll records are available.

17. There is no equipment on the property at the present time.

18. Within recent years considerable research has been done on the concentration of beryl ores. Only recently have these techniques been perfected and, with their perfection, it is now prudent that promising beryl properties be investigated. Because of the previous low prices and high cost of beryl production, it should not be expected that any considerable amount of exploration and development work has been done on such properties.

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dma 1101

Date received 5/2/51

Participation

William A. Reinken
Robert C. Horton
252 West First Street
Reno, Nevada

Name and address of applicant

Date April 25, 1951

FILL IN THIS BLOCK

Date of application April 25, 1951

Estimated cost $49,140

Mineral or metal Beryl and Mica

Percentage of Government participation 90%

Location of mine Elko County, Nevada

Date of filing MF-100 April 25, 1951

DMA Docket Number, if available dma 1101

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.

(*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.

*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.

*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.

*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.

15. State in detail how the ore could be shipped and how and where milled.

*16. History:

(*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.

(*b*) State briefly the known history and production of adjoining and neighboring properties.

(*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

*17. Production:

(*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)

(*a*) Describe the ore or mineral deposits briefly.

(*b*) Submit available maps and assay data.

(*c*) Give estimated tonnage and grade of each class of ore reserves.

19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?

21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

NOTE.—The Government will not participate in a project that will require more than 2 years to complete.

22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:

(*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.

(*b*) Supervisors, by numbers and positions, with salaries of each.

(*c*) Cost of necessary repairs to existing facilities, structures, and buildings.

(*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.

(*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.

(*f*) Cost of rental for equipment which the operator proposes to rent.

(*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.

(*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.

(*i*) Cost of power, water, utilities, and any other items not provided for above.

24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

- - -
(Name of company)

By [signature]
(Signature of authorized official)

April 25, 1951
(Date)

[signature]
(Title)

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

1. thru 5. Answered on MF-100

6. No claims, liens, or encumbrances are against the property.

7. A copy of the lease, which is in good standing, is attached.

8. This being a new venture, no financial statement is available.

9. We are prepared to invest $5,000, which is sufficient to pay our share of the costs of exploration in accordance with the regulations on Government participation.

10. (a) The property is located in the Ruby Mountains, Elko, County, Nevada, and more particularly, in Township 29 North, Range 58 East, Mount Diablo Base and Meridian. There are no operating mines on or near the property.

    (b) There is no legal description available, as these are unpatented mining claims, The area is described in the attached lease. Both areas in (a) and (b) are the same.

11. thru 14. Answered on MF-100.

15. The ore will be concentrated at the mine. The concentrates will then be hauled to Tobar, on the Western Pacific Railroad, and then shipped to the Beryllium Corporation of America, or to other buyers.

16. thru 18. Answered on MF-100.

19. Any conditions or circumstances not brought out by the foregoing questions have been discussed in form MF-100.

20. The exploration will be conducted in an effort to block out sufficient tonnage of beryl ore to warrant the construction of a mill. Sheet and fine ground ruby mica will also be produced and will allow us to mine a lower grade of beryl ore than if beryl alone were produced.

21. A complete geological map of the area will be made. All the pegmatite dikes which contain beryl will be sampled. Those dikes which appear to contain commercial ore will be sampled in detail. Three or four short drifts will be driven in the richer dikes to determine the character of the ore at depth and to aid in the calculation of the minimum tonnage of beryl ore present.

    In conjunction with the Western Machinery Company and the Western Knapp Engineering Company we will design a mill to treat the ore, providing the results warrant it.

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

This project will take four (4) months.

22. The area was mapped by J. C. Olson, R. E. Burns, and E. N. Hinrichs of the U. S. Geological Survey in 1948. The title of the map is "The Dawley Canyon Pegmatite Area, Ruby Mountains, Elko, County, Nevada." E. N. Hinrichs also compiled a geologic report of a small area, which gives the general geology of the region. The title of his report is "The Pegmatites of the Errington-Thiel Mine, Elko County, Nevada." A copy of the map and report is attached.

Very few samples have been taken at the property. In the past there was no way to concentrate beryl ores so there was no reason to sample the ore. From samples that are available, i.e. Hinrichs report and the samples assayed by the Bureau of Mines, it appears that a number of the dikes contain from 0.5% BeO to 1.0% BeO in the form of beryl.

Although complete geologic information is not available, it must be realized that beryllium has only recently become of major importance as a metal and that suitable metallurgical methods for concentrating the ore were developed only within the last three years; thus previous to the present time there was little incentive for developing beryl mines.

23.

(a)	6 miners @ $300.00	$7200.00
	1 cook @ $225.00	900.00
(b)	1 surveyor @ $500.00	2000.00
	1 geologist @ $500.00	2000.00
	1 consultant @ $750.00	3000.00
(c)	None	
(d)	Road Construction	5000.00
	Construction of bunk house and cook shack	5000.00
(e)	210 compressor	6000.00
	Air and water hose	500.00
	2 - 55 jackhammers	730.00
	2 - Bars and shells	670.00
	Rail and pipe	3000.00
	1/2 Ton pickup truck	2000.00
	Dynamite	1500.00
	Drill steel and bits	1000.00
	Timber	640.00
	Nails, wedges, spikes	50.00
(f)	None	

(g)	Transit $25.00/month	$ 100.00
	Aledaide $25.00/month	100.00
(h)	Hammers, axes, double jacks, jim crow, miscellaneous	250.00
(i)	Fuel - Gas and oil	1000.00
	Assays 500 @ $10.00	5000.00
	Metallurgical Report	1500.00
		$49140.00

24. First Month Expenses

Salaries	$ 3775.00
Equipment & Supplies	13,570.00
Assays	2000.00
Road Building	2500.00
Bunk house and cook shack	5000.00
	$ 26845.00

Compressor	$ 6000.00
Air & water hose	500.00
Jackhammers	730.00
Column, arm and shell	670.00
Rail and pipe	1500.00
Powder	750.00
Bits and steel	500.00
Timber	320.00
Wedges	50.00
Rent on Surveying instruments	50.00
Hammers, axes, double jacks, jim crow	250.00
Fuel	250.00
Total Equipment and supplies	$ 13570.00

Second Month

Salaries and wages	$ 3775.00
Road Building	2500.00
Rent on instruments	50.00
Fuel	250.00
Assays	2000.00
Metallurgical Reports	750.00
	$ 9325.00

Form MF-103
William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

Third Month

Salaries and wages	$ 3775.00
Rail and pipe	1500.00
Powder	750.00
Bits and steel	500.00
Timber	320.00
Rent on instruments	50.00
Fuel	250.00
Assays	500.00
	7645.00

Fourth Month

Salaries and wages	$ 3775.00
Rent on instruments	50.00
Fuel	250.00
Metallurgical reports	750.00
Assays	500.00
	$ 5325.00

First Month

Survey claims. Make topographic map and geology map. Sample dikes. Purchase compressor, jackhammers, powder, 1/2 ton pick-up truck. Build bunk house and cook shack. Build roads.

Second Month

Complete maps and sampling of claims. Send ore in for additional metallurgical tests. Start drifts on promising dikes.

Third Month

Continue drifts on promising dikes. Sample dikes on open ground around claims.

Fourth Month

Complete underground work. Complete sampling. Compute tonnage and grade of ore. Begin plans for mill. Complete metallurgical investigations.

Form MF-100
(March 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Form approved.
Budget Bureau No. 42-R1026.

GENERAL TECHNICAL DATA
FOR USE UNDER THE
DEFENSE PRODUCTION ACT OF 1950

NOT TO BE FILLED IN BY APPLICANT

Docket No. dmd 1101

Date received 5/21/51

William A. Reinken
Robert C. Horton
252 West First Street
Reno, Nevada

Name and address of applicant

Date April 25, 1951

INSTRUCTIONS

This form is to be filed with Defense Minerals Administration, Department of the Interior, Washington 25, D. C. It should be accompanied by appropriate application form when a specific type of Government assistance is requested, in the form of (1) loan, (2) purchase contract, (3) Government guarantee of a private loan, (4) Necessity Certificate pursuant to the provisions of Sec. 124-A (Amortization Deduction) of Internal Revenue Code, 1950, (5) priorities or allocation of mining equipment, and maintenance, repair and operating supplies, and (6) other forms of Government assistance that might arise under the Act. Submit four (4) signed copies of the form and accompanying papers. Name and address should be stamped or typed on each sheet of this form and all accompanying papers. *When a question is inapplicable it should be so stated on the form.* Additional sheets may be attached in answering any questions or in supplying additional information. (IF YOU CANNOT ANSWER A QUESTION, SO STATE.) If a question is answered elsewhere indicate where answered. It is not necessary to answer it again.

GENERAL TECHNICAL DATA

Supply the following information on separate sheets, arranged, numbered, and lettered as indicated:

1. Materials produced:
   (*a*) What are the chief mine, mill, or smelter products?
   (*b*) What are the byproducts, if any?
2. Name(s) and type(s) of mine(s), mill(s), smelter(s), refinery(ies), pit(s), quarry (ies), drilling operation(s). Include old names of property, if any. Show extent of workings, including the following:
   (*a*) Linear feet of shafts.
   (*b*) Linear feet of drifts and crosscuts.
   (*c*) Linear feet of tunnels or adits.
   (*d*) Linear feet of other mine openings (explain briefly).

   Indicate whether mine is flooded or not. Describe any pumping problems. Give size or productive capacity.
3. For each operation listed above supply the following:
   (*a*) Distance and direction from nearest town and shipping point.
   (*b*) Mining district.
   (*c*) Township, Section, Range.
   (*d*) County, State.
4. (*a*) State whether or not property is now in operation, and if in operation, by whom operated.
   (*b*) Are you operating this property as:
   - ☐ Owner.
   - ☒ Lessee.
   - ☐ Contractor.
5. Number of years in production None

   If not in production or operation, estimated date when production will begin cannot be answered
6. Experience of operators:

   Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who manage the project.
7. History:
   (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for suspension of operation.
   (*b*) State briefly the known history and production of adjoining and neighboring properties.
   (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

8. Names and addresses of Officers, Directors, or Partners, and in addition thereto, the five largest stockholders if applicant is a corporation.

Name and Address (a)	Official Title (If officer is also director indicate by "D") (b)	Total of Annual Salary, Commissions, Bonuses, Etc., Received From Applicant and Affiliates During Last Fiscal Year (c)	Estimated Net Worth Outside of Interest in Applicant (d)	Number of Shares Held in Applicant Corporation: Common (e)	Number of Shares Held in Applicant Corporation: Preferred (f)	Life Insurance Carried for Benefit of Applicant: Amount (g)	Life Insurance Carried for Benefit of Applicant: Net Cash Surrender Value After Loans (h)
William A. Reinken	Partner						
252 W. First St.							
Reno, Nevada							
Robert C. Horton	Partner						
252 W. First St.							
Reno, Nevada							
	Total		x x x x x			x x x x x	x x x x x

If more lines are needed continue on separate sheet.

9. Capital Stock Issues:

For Corporate Applicants

Item	Authorized (a)	Outstanding (b)	Par Value (c)	Number of Shares Outstanding (d)	Dividend Rate Last Paid* (e)
Common stock	$	$	$		
Preferred stock	$	$	$		

*Indicate period covered.

10. Production:

Item*	Kind of Product (a)	1948 Total (b)	1949 Total (c)	1950 Total (d)	Present Average Monthly (e)
1. Quantity of product mined or quarried (Short, long, metric tons; barrels; pounds; etc.)	Beryl	No records of production			
2. Quantity of product processed (specify unit of measure and type of process)		No present production			
3. Quantity and grade of product sold or shipped (specify units of measure)					

11. Do you contemplate a change in the present average monthly rate of production? If so, state estimated maximum monthly production and basis of change.

12. Ore or Mineral Reserves:

(a) Describe the ore or mineral deposit briefly. Accompany the application by any available report on the geology and ore reserves.

(*b*) If deposit is other than placer:

(1) Submit assay plans and/or sections showing location and size of proved (measured) and probable (indicated) ore or mineral reserve.

(2) State the tonnage (indicate type of ton) and grade of each class of ore reserve, as above, and show how computed. Tabulated total ore reserve as follows:

TOTAL ORE OR MINERAL RESERVES

Ore or Mineral Reserve	Estimated Tons (a)	Metal or Mineral Content Per Ton (Grade) (b)	Gross Value Per Ton (c)	Recoverable Unit Value Per Ton (d)	Estimated Cost of Production Per Ton (e)
Measured (proved)					
Indicated (probable)	Unknown	0.5%-1.0%	$14-$28	0.40% - 0.80%	Unknown

(*c*) If placer:

(1) Give estimated total yardage and average marketable mineral content of each deposit.

(2) Submit map showing location of placer deposit and surrounding area, with all test holes or pits. Submit logs of each hole and test pit with depth and average value of each.

(3) Describe gravel, stating whether fine, medium or coarse; loose, tight, cemented, or frozen, and whether it contains stumps or boulders more than 1 foot in diameter; if so, how large, and in what proportion.

(4) Describe bedrock, giving type (granite, sandstone, shale, etc.) and state whether it is hard or soft, smooth, uneven or rough.

(5) Describe overburden, stating whether loose, tight, or cemented; fine or coarse textured; furnish estimate of average thickness and total amount.

(6) Tabulate the reserves using the form outlined above for ore or mineral reserves.

13. Access Roads:

Give road distances to shipping, supply and residence points, stating kind and condition of roads.

14. Water Supply:

State source and quantity of water available for operations and whether sufficient for all seasons of year.

15. Power:

State amount of power used, rate per hour, and source thereof.

16. Labor:

State number and classes (miners, muckers, millmen, etc.) of men employed during a recent representative payroll period.

17. Equipment and Facilities:

Describe present equipment on the property, including buildings. (State condition.) List major pieces of equipment now owned or controlled and in serviceable condition available for this operation.

18. Are there any particular conditions or circumstances affecting your operations that are not described above? If so, explain.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

- - -
(Name of company)

By Robert C. Horton
(Signature of authorized official)

April 25, 1951
(Date)

Treasurer A. Rancher
(Title)

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—63792-1

ITEM 6. (b)

SCHRADER, Erich Julius, Cons. Min. Engineer, P.O. Box 244, Reno, Nevada and 19 Sierra St., Reno, Nevada; res. Colonial Apts.
Mining Engr.; b. Bremen, Ger., June 24, 1881; s. Ernst (Dr. Jur.) and Josephine (von Oroning) Schrader; ed. pvt. sch. in Ger. and pub. schs., St. Paul and Minneapolis, Minn.; Univ. of Minn., E.M., 1905; mem. Theta Tau. Various positions, U.S. and Mexico, 1905-12; Gen. Mgr., Spanish Belt Mine, Tonopah, Nev., 1918-21; Cons. work, Hammon Eng. Co. & Tonopah Min. Co., of Nev., 1922-28; Gen. Supt., Gold Circle Cons., Midas, Nev., 1928-29; Asst. Gen. Mgr., Seven Troughs Gold Mines Co., 1920-30, cons. engr., Weepah, Nevada Mining Co., and others, 1930 to date. Mem. State Mining Advisory Bd., 1944 to date. Specialized in the cyanidation of gold and silver ores and mine mgmt. Author: Lane Mill Data (Min. & Sci. Press, Vol. 107); The Rockland Mines (E. & M. J., Vol. 99); and other contbns. to tech. prest. Mem A. I. M. E. Rep. Pret.

Ref: Who is Who in Engineering, 1948

William A. Reinken, Robert C. Horton
252 West First Street, Reno, Nevada

1. (a) Beryl concentrates
   (b) Ruby mica (muscovite)

2. (a, b, c, d) No underground workings of any extent.

3. (a) 56 miles from Tobar, Nevada - Western Pacific Railroad;
   65 miles from Wells, Nevada - Southern Pacific Railroad and Western Pacific Railroad;
   65 miles from Elko, Nevada - Southern Pacific Railroad and Western Pacific Railroad.

   (b) Unnamed mining district in the Ruby-East Humboldt Range.
   (c) Township 29 North, Range 58 East, Mount Diablo Base Meridian.
   (d) Elko County, Nevada.

4. (a) Property is not in operation.

6. William A. Reinken: Geological Engineer. One year as geologist with U. S. Geological Survey. Registered Professional Engineer. At present with the United Engineers, Reno, Nevada.

   Robert C. Horton: Geological Engineer. One year as geologist with U. S. Geological Survey. At present consulting geologist with the United Engineers, Reno, Nevada.

   (b) Erich Schrader: Consulting engineer for the project. See attached sheet for qualifications.

7. (a) The property has been worked only as a mica mine. The production has been small and no records were kept. A small amount of beryl, hand picked, has also been shipped. There are no records of these shipments.
   (b) There are no adjoining mines other than small prospects.
   (c) At the present time we are sampling some of the dikes, but the results are not yet available. A geological report and map by E. Neal Hinrichs of the U. S. Geological Survey and a metallurgical report on work done by the U. S. Bureau of Mines on samples from the Errington-Theil property in the Ruby Mountains are attached.

12. (a) See attached Hinrichs report. At the present time insufficient work has been done to allow an accurate estimate of the tonnage or grade of ore that could be mined.

13. Nevada State Highway No. 11 is located on the eastern boundary of the property. The road is a secondary gravel road, but is in good condition. Tobar, the shipping point, is 56 miles from the mine. This road is in good shape. Wells, Nevada, is 65 miles and Elko, Nevada, 65 miles from the property. The roads to both Wells and Elko are part gravel and part asphalt.

14. Sufficient water is available from mountain streams. Underground water may be developed by shallow drilling. The amount of water available is more than ample for all operations.

15. The only power needed at the present time is for the operation of a compressor. The compressor, however, will be a portable unit, complete with power unit. If the property warrants building a mill, power will be supplied by diesel generators at the property.

16. This is a new operation, so no past payroll records are available.

17. There is no equipment on the property at the present time.

18. Within recent years considerable research has been done on the concentration of beryl ores. Only recently have those techniques been perfected and, with their perfection, it is now prudent that promising beryl properties be investigated. Because of the previous low prices and high cost of beryl production, it should not be expected that any considerable amount of exploration and development work has been done on such properties.

Dual 11 01

FORM MF-103

WILLIAM A. REINKEN, ROBERT C. HORTON

252 West First Street
Reno, Nevada

The pegmatites of the Errington-Thiel mine, Elko County, Nevada

E. Neal Hinrichs

Abstract

An area 300 by 500 feet near the Errington-Thiel mica mine in northeastern Nevada was mapped on a scale of 1 in. = 20 ft. by the U. S. Geological Survey during the summer of 1948. Eleven pegmatite dikes, 2 to 11 feet wide, cut the Prospect Mountain quartzite of Lower Cambrian age in this area. The pegmatites are believed to have been formed by the residual fluids of an adjacent granite stock filling fractures associated with regional folding. Irregular and gradational boundaries between pegmatite and granite indicate a close genetic relationship.

The minerals found in the pegmatites are plagioclase, quartz, muscovite, perthite, garnet, beryl, microcline, spatite, zircon, hematite, biotite, phlogopite, tourmaline, and penninite. The plagioclase is albite ($Ab_{97}An_{03}$) except in one pegmatite, where it is oglioclase ($Ab_{88}An_{12}$). The garnet in the pegmatites differs from that in the adjacent schist in refractive index and specific gravity. Beryl crystals, 2 to 5 mm. in size, are disseminated throughout the pegmatites. The weight percent of beryl in 21 thin sections ranges from 0 to 1.62.

The alkali content of beryl found in the wall zone is greater than the alkali content in the core, the reverse of the normal variation. Microcline veinlets cut albite, evidence that albite crystallized before microcline. There is little evidence of mineral replacement. Fifteen photomicrographs

Contents

	Page
ABSTRACT	6
Introduction	8
Location	8
Field work	8
Acknowledgements	9
Previous geologic work	9
Geography	10
Geologic setting	10
General features	10
Metamorphic rocks	10
Intrusive igneous rocks	12
Pegmatite	15
Distribution and size	15
Structural and textural characteristics	15
Mineralogy	17
Description of individual minerals	17
Paragenesis	20
Genesis	24
Description of pegmatite	26
Western dike	26
Northwestern dike	29
Eastern dike	30

Illustrations

Plate 1.-- Photograph of the north slope of Dawley Canyon. The high point, at right, composed of schist and granite, is cut by pegmatites. Granite is left . . . . . .

Plate 2.-- Detailed preliminary geologic map of the pegmatite .

Plate 3,A- Photograph of a quartzite-schist xenolith in granite, southwest edge of the muscovite granite. Altitude, 7920 feet. . . . . .

Plate 3,B- Photograph of a roll of the Western dike in the northern pit. This roll is about 10 feet south of the wall zone shown in plate 4,B . . . . . .

Plate 4,A- Photograph of the northeast face of the "pegmatite" hill. Pegmatite dike and sill cut quartzite and schist . . . . . .

Plate 4,B- Photograph of the coarse-grained wall zone, W, 6 inches thick, finer-grained intermediate zone I, and coarse-grained core, C, northern pit, Western dike . . . . . .

Plate 5,A- Photomicrograph of muscovite veinlets, M, in albite, Ab, and quartz, Q, wall zone at footwall of Northwestern dike. 31X, crossed nicols . . . . .

Plate 5,B- Photograph of the Eastern dike. Note the bands of garnet, G, in plagioclase, quartz, and muscovite . .

Plate 6,A- Photomicrograph of a beryl crystal, B, in contact with garnet, G. Wall zone, at hanging wall, Northwestern dike. Albite, Ab; quartz, Q. 31X, crossed nicols . . . . . .

Plate 6,B- Photomicrograph of a beryl crystal, B, in contact with garnet, G. Wall zone, at hanging wall, Northwestern dike. Albite, Ab; quartz, Q. 31X, crossed nicols . . . . . .

Plate 6,B- Photomicrograph of microcline, Mi, and quartz, Q, veinlets in albite, Ab, wall zone of Western dike, 31X, crossed nicols. . . . . .

Plate 7,A- Photomicrograph of microcline, Mi, and muscovite, M, veinlets in albite, Ab, central zone, Northwestern dike. 31X, crossed nicols . . . . . .

Plate 7,B- Photomicrograph of microcline veinlets, Mi, in albite, Ab. Border zone at the hanging wall, Western dike. 31X, crossed nicols . . . . . .

Plate 8,A- Photomicrograph of albite, Ab, enclosing quartz, Q, apatite, A. Border zone at east side of Eastern dike. 72X, crossed nicols . . . . . .

Plate 8,B- Photomicrograph of beryl, B, in albite, Ab, quartz, Q, muscovite, M, and zircon, Z. Wall zone, at hanging wall, Northwestern dike. 31X, crossed nicols . . . . . .

Plate 9,A- Photomicrograph of garnet, G, enclosing beryl, B, biotite, Bi, and veinlets of hematite, H. Quartz, Q, muscovite, M, and zircon, Z, are adjacent to the garnet. Border zone at east side of Eastern dike. 72X, plane-polarized light . . .

Plate 9,B- Photomicrograph of apatite inclusion, A, in beryl, B, Muscovite, M, quartz, Q, border zone at hanging wall of Northwestern dike. 159X, crossed nicols .

Plate 10,A- Photomicrograph of beryl, B, in albite, Ab. Quartz, Q, Border zone at footwall, Northwestern dike. 31X, crossed nicols . . . . . .

Plate 10,B- Photomicrograph of inclusions of beryl, B, and quartz, Q, in muscovite, M. Albite Ab. Wall zone at footwall of the Northeastern dike. 31X, crossed nicols. . . . . .

Plate 11,A- Photomicrograph of muscovite, M, enclosing quartz, Q, and beryl, B. Border zone at footwall of Western dike. 31X, crossed nicols . . . . . .

Plate 11,B- Photomicrograph of garnet, G, enclosing muscovite, M, quartz, Q, beryl, B, and veinlets of hematite, H. Wall zone at footwall of Northwestern dike. 72X, plane-polarized light . . . . . .

Plate 12,A- Photomicrograph of albite, Ab, muscovite, M, and apatite, A, inclusions in garnet, G. Border zone of hanging wall, Northwestern dike. 159X, plane-polarized light. . . . . .

Plate 12,B- Photomicrograph of garnet, G, embayed by quartz, Q. Albite, Ab, muscovite, M. Wall zone at footwall of Northwestern dike. 30X, crossed nicols .

Plate 13-- Photograph of the adit and the Western dike . . .

Figure 1.-- Index map of Nevada. The Errington-Thiel mine is marked by an X . . . . . .

2.-- Graph of mineral paragenesis. . . . . .

Table 1.-- Micrometric analysis for beryl. . . . . .

illustrate grain boundary relationships, such as albite and beryl in garnet, apatite in beryl, and lobate, anhedral beryl grains in albite.

Introduction

The occurrence and origin of a group of mica-beryl deposits in the vicinity of the Errington-Thiel mine, Elko County, Nev., were investigated in the field by the writer from July 26 to September 13, 1948, while he was assisting J. C. Olson of the U. S. Geological Survey in mapping these deposits. Thirty-four hand specimens and 26 thin sections from three of these deposits were studied in detail during the following winter in the laboratories of the Department of Geology, Cornell University.

Location

The mica-beryl deposits of the Errington-Thiel property are in pegmatites in Dawley Canyon on the east side of the Ruby Mountains (fig. 1). No topographic or geologic maps or aerial photographs of the Dawley Canyon area are available, although the Jiggs and Halleck quadrangle maps (U. S. Geol. Survey, 1:62,500, 1935 and 1937) cover nearby areas of the Ruby Mountains. The Dawley Canyon area is shown on a compiled planimetric map of the Humboldt National Forest (U. S. Forest Service, 1:250,000, 1936) and on quadrangle map number 204 of Elko County (U. S. Forest Service, 1:62,500).

Field Work

The field work was directed by J. C. Olson, geologist in charge of pegmatite investigations for the U. S. Geological Survey in Nevada, and the laboratory work was under the supervision of W. T. Holser, Department of Geology, Cornell University.

The topography and geology of the Errington-Thiel mine, in the SE¼ sec. 8, T. 29 N., R. 58 E., Mount Diablo base and meridian, was mapped on a scale of 1 in. = 20 ft. (pl. 2). In addition, the lower north side of Dawley Canyon was mapped on a scale of 1 in. = 800 Ft.

Acknowledgments

The writer is indebted to Dr. Holser for his stimulating criticism and review of the manuscript and to Mr. J. C. Olson and L. R. Page of the U. S. Geological Survey for guidance during the field work. Mr. Oscar W. Thiel of Ruby Valley, Nev., kindly furnished information about the history of the mine.

Previous geologic work

The geology of the Ruby Mountains has been described by Hill _/ and Sharp _/. The mica-beryl deposits were examined in 1942 by

_/ Hill, J. M., Mining districts in eastern Nevada: U.S. Geol. Survey Bull. 648, pp. 54-63, 1916.

_/ Sharp, R. P., Basin-range structure of the Ruby-East Humboldt Range, northeastern Nevada: Geol. Soc. America Bull. vol. 50, pp. 881-920, 1939.

J. H. Wiese and in 1944 by D. J. Fisher, both of the U. S. Geological Survey. _/

_/ Dept. Interior information service, Geol. Survey Public Notice 103897, Beryl pegmatites of the Ruby Mountains, Nevada, December 21, 1944.

Geography

Dawley Canyon in the Ruby Mountains, Nev., is in an area of high relief typical of the Basin and Range physiographic province. Altitudes range from 6,500 feet in Ruby Valley to 10,934 feet at the crest of the Ruby Range, 3½ miles northwest. The south slopes near Errington-Thiel mine are as steep as 40° (pl.1).

The climate in the Ruby Mountains is dry, and warm to cool. Little rain falls, but mountain springs and year-round snowfields feed streams that drain into Ruby Valley.

Vegetation is scarce, so comparatively fresh rock is amply exposed. Piñon pine grows on the higher slopes; mountain mahogany and buck brush grow best on lower ridges. Willow and small-toothed aspen flourish along the creeks and near the springs.

Geologic setting

General features

The upper part of Dawley Canyon is underlain by a granite stock that extends across the Ruby Range southward to Harrison Pass. In the lower part of Dawley Canyon granite and associated pegmatites have intruded the Prospect Mountain quartzite and inter bedded schist of Lower Cambrian age.

Metamorphic rocks

The Prospect Mountain quartzite dips generally eastward in Dawley Canyon, but on the western side of the hill on which the pegmatites are exposed, local intrusions have reversed the dip (pl 2). Jointing is prominent only in the northeastern

outcrop (pl.1), where five or six joints strike about N. 15° E. and dip about 83° SE.

In the area mapped, about 80 feet of pale-gray medium-grained Prospect Mountain quartzite is exposed. The total thickness of this formation in the southern Ruby Mountains is 1,400 feet, according to Sharp. _/ Quartzite layers, 6 inches to 5

_/ Sharp, R. P., Stratigraphy and structure of the southern Ruby Mountains, Nevada: Geol. Soc. America Bull. vol. 53, pp. 651, 675, 1942.

feet thick, commonly are cross-bedded and are separated by quartz mica schist beds 3 inches to 4 feet thick. The quartzite that lies directly above schist contains flat quartz pebbles half an inch long. The quartzite is composed of quartz, biotite, and muscovite, with minor amounts of apatite and zircon.

The foliation of the quartz-mica schist is irregular, knotty, and poorly developed parallel to the bedding. The schist is composed mainly of muscovite, hornblende, quartz and biotite. The accessory minerals are garnet, apatite, magnetite, and thin aucular crystals that are probably sillimanite. The average composition of the garnet from three localities, as determined from its refractive index and specific gravity, _/ is 65 percent

_/ Winchell, A. N., Elements of optical mineralogy, vol. II, pp. 176, 180, Wiley, 1933.

almandite, 18 percent andradite, and 17 percent pyrope, although one specimen from a knotty schist has an apparent composition of

96 percent grossularite, 2 percent andradite, and 2 percent almandite.

Intrusive igneous rocks

Muscovite granite, biotite-muscovite granite, and pegmatites intrude the schist and quarzite. The largest mass of muscovite granite is exposed about 200 yards northwest of the area mapped. Muscovite granite also crops out in the eastern part of the mapped area (pl.2). In both exposures the granite varies in textures. In the eastern exposure it is fine-to medium-grained and contains small pegmatitic lenses, areas of porphyritic texture, and xenoliths of quartzite and schist (pl. 3,A). The boundaries between these textural types of granite a re gradational and irregular. The principal minerals of the muscovite granite are quartz, oligoclase, orthoclase, and muscovite. The accessory minerals are garnet, apatite, and zircon. Phenocrysts of orthoclase as much as 1½ inches long occur in the small outcrop in the northeast corner of the area mapped.

Biotite-muscovite granite crops out in two areas at an altitude of about 7760 feet in the southwest part of the area mapped. It intrudes quartzite and schist and is intruded by a pegmatite. This is part of the granite stock exposed at Harrison Pass and described by Sharp _/ as a coarse-grained

---

_/ Sharp, R. P., Stratigraphy and structure of the southern Ruby Mountains, Nevada: Geol. Soc. America Bull., vol. 53, p. 673, 1942.

_/ Sharp, R. P., Basin-range structure of the Ruby-East Humboldt Range, northeastern Nevada: Geol. Soc. America Bull., vol. 50, p. 888, 1939.

---

to porphyritic biotite granite composed of quartz (about 20 percent), orthoclase (45 percent), well-zoned oligoclase (33 percent), biotite (2 percent), and minor quantities of apatite and zircon. Masses of medium-grained muscovite-biotite granite along the borders indicate that the stock may be a multiple intrusion. Sharp believes that the age of the stock is late Jurassic or early Tertiary.

Three facts suggest that the area mapped is probably underlain by a large intrusion of muscovite granite: First the Prospect Mountain quartzite, which has a gentle to moderate dip on the east side of the Ruby Range, dips 5° 46° west, near the Errington-Thiel mine. The intruding muscovite granite probably tilted a block of quartzite westward. Second, quartzite-schist xenoliths (pl. 3,A), are present in the muscovite granite exposed in the eastern part of the area mapped (pl.2). The intruding granite buoyed up and isolated fragments of the overlying quartzite and schist. Finally, large granite intrusions are numerous in this and adjacent areas.

The pegmatites very likely are off-shoots of the underlying granite. The four contacts of muscovite granite and pegmatite that are exposed show only that the pegmatites intrude the granite; the wide variation in texture of the muscovite granite however, may indicate that the pegmatites are genetically related to the granite. Gradations between granite and pegmatite

occur in many small, irregular-shaped areas with porphyritic textures.

Quartz veins intrude the quartzite, granite, and pegmatites. The quartz veins in schist are small and concordant with the foliation. At an outcrop near the center of the Eastern dike (pl.2) a quartz vein separates quartzite and granite and cuts across the end of a small dike. A quartz vein intrudes the wall zone of the Western dike (pl. 3,B).

Pegmatite

Distribution and size

Eleven pegmatite dikes and at least three small pegmatite sills intrude the granite, schist, and quartzite in the area mapped, but only the Western, Northwestern, and Eastern dikes were studied in detail. The dikes, 10 to 50 feet apart, are parallel, strike northward, and dip eastward from 40° to vertical. They are 30 to 350 feet long, and 2 to 12 feet thick.

Structural and textural characteristics

The pegmatite dikes, particularly the Eastern dike, strike parallel to the more prominent joints in the schist and quartzite (pls. 2 and 4,A), and parallel to the normal fault (post-upper Niocene) that forms the eastern boundary of the Ruby Range. _/

_/ Sharp, R. P., Basin-range structure of the Ruby-East Humboldt Range, northeastern Nevada: Geol. Soc. America Bull., Vol. 50, p. 900, 1939.

The contacts of the pegmatites with schist and quartzite are generally sharp and even. No evidence of thermal metamorphism was noted. Contacts of granite with pegmatite are gradational and irregular.

All but three small pegmatite dikes are zoned, that is, they are composedof shells of contrasting texture and mineral arrangement, which are parallel to the walls (pl. 4,B). The zones from the contact inward are called the border zone, the wall zone, intermediate zones, and the core. _/ Only one or

_/ Cameron, E. N., Larrabe, D. M., McNair, A. H., Page, J. J., Shainin, V. E., and Stewart, G. W., Structural and economic characteristics of New England mica deposits: Econ. Geol. vol. 40, no. 6, p. 373, 1945.

two sections across a dike show all types of zones because the zones are discontinuous. Three types are most common: The border, wall, and intermediate zones. The border zones, generally less than 2 inches thick, are composed of muscovite grains, a quarter of an inch in maximum diameter, with varying, but generally small, amounts of quartz and plagioclase. The wall zones are composed of one-half to 4-inch grains of muscovite, quartz, and plagioclase (pl. 4,B). The intermediate zones consist of grains as large as 1 inch. Many of the intermediate zones contain 2-to 6-inch clusters of perthite and cleavelandite grains, 1 to 3 inches in diameter. The cores are discontinuous elongated lenses composed of 1- to 6-inch grains of quartz, or quartz and muscovite.

Mineralogy

The minerals in the pegmatites, in order of abundance, are: plogioclase, quartz, muscovite, perthite, garnet, beryl, microcline, apatite, zircon, hematite, biotite, phlogopite, tourmaline (schorlite), and penninite.

Description of individual minerals. The plagioclase is albite ($Ab_{97}An_{03}$) except in one of the 23 samples taken from six cross sections. At the northernmost pit of the Western dike, the border and outer wall zones contain oligoclase (Ab88An12). The percent of anorthite molecule was determined by measuring the refractive indices of (001) and (010) cleavage flakes, and by applying the refractive index to a curve by Tauboi, reproduced by Rogers and Kerr._/ White to pale yellow

---

_/ Rogers, A. F., and Kerr, P. F., Thin section mineralogy, 1st ed., McGraw-Hill, p. 213, 1933.

---

albite occurs abundantly in the pegmatite as the ordinary anhedral form and also the tabular form cleavelandite. The typical granitoid textures contain albite, quartz, and muscovite grains 0.2-1.5 mm. in diameter. The cleavelandite plates are about 1.5 mm. in diameter, about 1.5 mm. thick, and as much as 19 mm. long. Polysynthetic albite twins, composed of lamellae varying greatly in width, predominate, but carlsbad twins also occur.

Quartz occurs in the pegmatite as glasey, gray anhedral grains and veinlets. Some of the grains contain streaks of very small rounded inclusions of a composition indeterminable under a microscope.

Pale-green to pale-brown muscovite, generally free from stains and ruled markings, occurs in all zones. It is most abundant in the wall zones, where books as wide as 5 inches show a preferred orientation perpendicular to the zone contacts. Scattered large books occur in or near the cores. In thin section the muscovite grains are rectangular or lath-shaped; a few are simple twins. Some flakes are bent along fractures (pl. 5,A).

Individual crystals and curved layers of red garnet crystals as much as 4 mm. in diameter are scattered throughout the pegmatite (pl. 5,B). The larger crystals are rusty red-brown; the smaller ones are clear red-orange trapezohedrons with small dodecahedral faces. Measurements of specific gravity and index of refraction, supplemented by a qualitative test for manganese indicate that the garnets are of uniform chemical composition. The specific gravity is 4.12 $\pm$ 0.01, the index of refraction 1.82 $\pm$ 0.005, and manganese is present. The composition is therefore 54 percent spessartite, 36 percent almandite, and 10 percent andradite. _/ Some garnet is

_/ Winchell, A. N., Elements of optical mineralogy, vol. II, 3d ed., Wiley, p. 180, 1933.

altered to hematite and penninite.

Beryl occurs in the pegmatite as pale-green to white euhedral crystals generally less than a millimeter but as much as 5 mm. in diameter. Most of the crystals are tapering hexagonal prisms, rounded at the larger ends and terminated at the smaller by pyramids (pl. 6,A). Cross fractures are common. Beryl occurs sparingly in each zone of the dikes sampled, the only noticeable concentration being in the outer part of the wall zone. A variation in alkali content from zone to zone is shown in the Western pegmatite that was adequately sampled. The refractive index of the ordinary ray (No) ranges from 1.580 in the wall zone to 1.576 in the core and indicates a range of 1.25 to 0.8 percent in total alkali content respectively. _/ The

---

_/ Winchell, A. N., Elements of optical mineralogy, vol. II, 3d ed., Wiley, p. 213, 1933.

---

interference figures of the beryl are characteristically indistinct; most optic axis figures show a blurred cross, with a gray center.

Microcline occurs only in small veins in the wall zone of the Western dike and in the intermediate zone of the Northwestern dike. The microcline veinlets in the wall zone of the Western dike taper and end in large albite grains (pl. 6,B). At the northern end of the Northwestern dike, the intermediate zone, composed of plagioclase, quartz, and muscovite contains veinlets of microcline that cut across albite (cleavelandite) grains (pl. 7,A). The microcline in both the Western and Northwestern dikes is cloudy and shows faint quadrille twinning under the

microscope (pl. 7,B).

Apatite is present in all zones as small pale blue-green rods enclosed in quartz and albite (pl. 8,A). Most of the rods are shorter than 0.2 mm., although one, 0.9 mm. long, occurs in albite parallel to the twinning. The accessory mineral, zircon, forms clusters of minute angular grains and, rarely, small tetragonal bipyramids (pl. 8,B). Hematite rims and fills fractures in altered garnet (pl. 9,A). Two isolated cubes of hematite are probably pseudomorphs after pyrite. Biotite occurs mostly near contacts with schist, although it also is found in the center of the Northwestern pegmatite (pl. 2) near altered garnet. A few grains of phlogopite were identified in the hanging-wall part of the Northwestern pegmatite. The phlogopite is colorless and except for a smaller optic angle is similar to muscovite. Black tourmaline is present sparingly as small irregular grains near the footwall contact of the Northwestern pegmatite.

Paragenesis. The sequence of crystallization of these minerals has been determined on the basis of two kinds of evidence. First, assuming that the pegmatite fluid crystallized from the border zone inward to the core without subsequent replacement, the zonal position of the minerals in the pegmatite should indicate the relative ages. Second, vein minerals are younger than the host.

Schorlite occurs only at the footwall contact of the Northwestern dike exposed at the open pit. It could have crystallized early or late. No fractures in the pegmatite or adjacent schist were noted, and no evidence of replacement at the contact was observed; therefore the schorlite is believed to be one of the first minerals to have solidified. The zonal position of biotite is the only evidence of its age relationship, and the evidence is conflicting. One grain of biotite is found in contact with hematite adjacent to a garnet crystal near the center of the Northwestern dike. Three biotite flakes occur in muscovite near the footwall contact of the Northwestern dike with schist. A biotite grain is in a garnet grain at the eastern contact of the Eastern dike with quartzite (pl. 9,A). Probably the biotite near the contacts of pegmatite with schist and quartzite came from the schist and quartzite. The biotite in garnet is believed to have formed earlier than the garnet. Apatite and zircon occur as small inclusions in albite, quartz (pl. 8,A), and beryl (pl. 9,B); therefore, apatite and zircon crystallized either earlier than albite, quartz, and beryl or at the same time. Oligoclase is found in the border and outer wall zone of the Western dike, and albite occurs in the inner zones. Thus, by zonal position, oligoclase crystallized before albite. This sequence conforms with the normal crystallization of plagioclase._/

_/ Bowen, N. L., Melting phoomena of the plogioclase feldspars: Am. Jour. Sci., 4th ser., vol. 35, p. 583, 1913.

Beryl occurs as subhedral crystals with albite, muscovite, and quartz (pls. 6,A and 9,B), as lobate anhedral grains in albite (pls. 8,B and 10,A), and as anhedral inclusions in muscovite (pls. 10,B and 11,A), garnet (pl. 11,B), and albite (pl. 8,A). The grain relationships of beryl and albite indicate simultaneous growth or microscopic replacement. The only inclusion found in the beryl is a small rod of apatite (pl. 9,B). The beryl is believed to have begun crystallization of albite, muscovite, quartz, and garnet. Landes _/ and Gedney _/ believe

---

_/ Landes, K. K., Origin and classification of pegmatites: Aml Mineralogist, vol. 18, p. 97, 1933.

_/ Gedney, E. K., Beryllium ores of New England: Am. Mineralogist, vol. 15, p. 120, 1930.

---

that most common beryl is magmatic and that some is hydrothermal.

The garnet crystals in the pegmatite enclose grains of beryl, albite, and biotite (pls. 9,A; 11,B; and 12,A). A garnet crystal is embayed by a quartz grain (pl. 12,B). The refractive indices and specific gravities indicate that the composition of the garnets in the pegmatite is 54 percent spessartite molecule, 35 percent almandite molecule, and 10 percent andradite molecule. The garnets of the schist contain 65 percent almandite molecule, 18 percent andradite molecule, and 17 percent pyrope molecule. The garnets of the pegmatite contain inclusions of albite and beryl and differ in chemical composition from the garnets of the surrounding schist. These facts point to a magmatic origin of garnets in the pegmatite.

Quartz, muscovite, and microcline fill fractures in albite and are therefore younger (pls. 6,B; 7,A; 7,B; 9,B). The relationship of these three vein-filling minerals to each other was observed in only a few thin sections. Quartz fills fractures between microcline and muscovite (pl. 6,B); thus some quartz crystallized before microcline or muscovite. The sequence of albite preceding microcline is the reverse of the order of crystallization of feldspars in pegmatite as given by Schaller _/ and Switzer._/ Landes _/ also noted that albite

---

_/ Schaller, W. T., Mineral replacements in pegmatites: Am. Mineralogist, vol. 12, p. 61, 1926.
_/ Switzer, G., Paragenesis of the Center Stafford, N. H., pegmatite: Am. Mineralogist, vol. 23, p. 812, 1938.
_/ Landes, K. K., Origin and classification of pegmatites: Am. Mineralogist, vol. 18, p. 98, 1933.

---

commonly replaces earlier potassium feldspars.

Hematite and penninite, products of the alteration of garnet, crystallized last.

Genesis

The origin of pegmatites by injection of granitic material was first proposed by Charpentier _/ in 1823. Later this idea

_/ von Charpentier, J. T., Essai sur la constitution geognostique des Pyrenees, p. 158, 1823.

was modified to the aqueous magma theory by Elie de Beaumont. _/

_/ de Beaumont, Elie, Sur les emanations volcaniques et metalliferes: Soc. geol. France Bull. vol. II, p. 12, 1847.

In 1915 that is, after the pegmatite has partly or wholly crystallized, solutions moving along the walls or fractures replace the earlier minerals. As very little or no replacement of pre-existing pegmatite is evident in the pegmatites of the Errington-Thiel mine, the pegmatites are, according to the classification of Landes, _/ simple rather than complex. The

_/ Landes, K. K., Origin and classification of pegmatites: Am. Mineralogist, vol. 18, p. 95, 1933.

only probable evidence of hydrothermal action is altered garnet, and a few grains of microcline doubtfully replacing albite (pls. 6,B; and 7,B). Replacement on a microscopic scale during the pegmatitic stage is shown by albite and beryl textures (pls. 8,B; and 10,A).

The pegmatites of the Errington-Thiel mine probably were derived from solutions expelled during the last stages of crystallization of the adjacent granite stock. Irregular and gradational boundaries between granite and pegmatite suggest a close genetic relationship.

The eastern outcrop of muscovite granite, less than 100 yards from the pegmatite dikes and sills (pl. 2), contains bands and lenses of quartz and feldspar ranging in texture from fine-grained granite to pegmatite. Both the granite and the pegmatite contain plagioclase, quartz, muscovite, and garnet. It is believed that as the granite crystallized, H_2O, Na_2O, K_2O, SiO_2, and BeO were concentrated in the residual fluid and assisted in keeping the magma mobile at comparatively low temperatures. _/ This residual fluid was injected into fractures

---

_/ Smith, F. G., Transport and deposition of the non-sulfide vein minerals, III phase relations at the pegmatitic stage: Econ. Geol. vol. 43, p. 536, 1948.

---

in previously metamorphosed schist and quartzite. The fractures probably were formed by the regional forces associated with the folding of the rocks in the Dawley Canyon area. The regional nature of the fracturing is indicated by the fact that all the 200 to 250 dikes in the Dawley Canyon map area strike northward and are parallel to joints in the schist and quartzite. If it is assumed that the pegmatite crystallized from the residual fluid of the granite stock, the fracturing must have occurred

earlier than the eastern boundary fault (post-upper Miocene). Sharp states that "The folding occurred after the deposition of the Permian (?) Upper limestone and before or contemporaneously with intrusion of the late Jurassic or early Tertiary igneous rocks."_/

_/ Sharp, R. P., Basin-range structure of the Ruby-East Humboldt Range, northeastern Nevada: Geol. Soc. America Bull. vol. 50, p. 890, 1939.

The pegmatites of the Errington-Thiel mine crystallized as thin, straight-walled dikes and sills from the residual fluid of a late Jurassic or early Tertiary granite stock. The dikes and sills pushed apart and filled parallel fractures that were formed by forces associated with regional folding. Various degrees of zoning occur in the dikes. The component minerals, other than the common plagioclase, quartz, and muscovite, include early beryl and garnet. Microcline has crystallized after albite, the reverse of the usual order.

Description of individual pegmatite dikes

Western dike. The westernmost of the two longest pegmatite dikes shown on plate 2 is designated the Western pegmatite. It is about 8 feet wide and 290 feet long. It strikes N. 10° W. and dips about 70° E. into schist, granite, and quartzite. Most of the contacts with the schist and quartzite are even and distinct, but the pegmatite grades into the muscovite granite. Two small irregularities in this tabular pegmatite body are exposed at the northern pit (pl. 3,B) and above the adit.

The Western dike can be divided into five zones; however, only four are present in most of the exposures. The border zone, 4 inches thick, consists of fine-grained albite, quartz, muscovite, and a few crystals of beryl. Inside the border zone is the wall zone, 2 feet thick, that is composed of coarse-grained muscovite, quartz, albite, and garnet. The muscovite is in 3 by 4 inch clear, pale-green books that are fractured, perhaps by blasting. In thin sections, small microcline veinlets can be seen cutting albite. The intermediate zone, averaging 2 feet in width, is composed of fine- to medium-grained albite and quartz that surrounds clusters of coarse-grained cleavelandite. A discontinuous core of very coarse-grained quartz and muscovite is exposed for about 6 feet at the northern open pit (pl. 4,B).

In 1944 the Columbia Mica Corporation, under lease from the owners, Mrs. A. T. Errington and Mr. Oscar W. Thiel, excavated about 80 feet of underground workings (pls. 2 and 13). Although sheet mica was mined from the wall zones (1.5 feet wide on the hanging wall), little sheet muscovite is now exposed in the face. Production data were not available. The average piece of muscovite on the sump from the adit is 2 inches by 3 inches.

Table I contains data on the beryl content of each zone as measured on a micrometer stage by the Rosiwal method. The length of beryl grains ranging in size from 0.2 to 5 mm. and

the total length of all other grains were measured by traverses across 21 thin sections of three pegmatites. The weight percent of beryl was calculated without any correction for specific gravity as the range of specific gravity of beryl approximates that of pegmatite. Beryl is absent from thin sections of the wall zone at the footwall of the Northwestern pegmatite and from the intermediate zone of the Eastern pegmatite. Beryl ranges up to 1.62 percent of other zones.

Northwestern dike. The Northwestern pegmatite is the dike farthest to the northwest. It is 11 feet thick, strikes roughly north, and dips about 36° E. It is exposed for about 100 feet (pl. 2). Although the same minerals occur in this pegmatite as in the Western dike, they are not grouped into such distinct zones. The open pit, worked for mica first in 1938, exposes a vertical face composed predominantly of a central zone 6 feet thick, of medium-grained albite, quartz, and muscovite with a few bands of small garnet crystals. Microscopic veinlets of microcline cut albite. The wall zone contains cleavelandite and coarse-grained muscovite. A small amount of beryl is present in the pegmatite, but most of it is in the border zone (see table 1). Black tourmaline occurs as a few small, flattened and broken grains at the footwall contact with schist in the bottom of the open pit.

Eastern dike. The Eastern dike, one of the two longest pegmatites, is 8 feet wide and about 350 feet long (pl. 2). It strikes north and dips 50° - 80° E. Two small dikes branch off the larger one and extend into the surrounding schist. Two sills, each about a foot thick, crop out in quartzite at the cliff in the northeastern part of the map area. One of these sills is visible in a photograph (pl. 4,A). The 3-inch border zone consists of medium-grained quartz and muscovite. The wall zone, 1 foot wide, is composed of fine- to medium-grained albite, quartz, and muscovite, plus a few beryl crystals as large as 5 mm. in diameter. A distinctive feature of the Eastern dike is garnet occurring in wavy bands and streamers (pl. 5,B). Thin layers of small, rusty garnet crystals separate the intermediate zone from the wall zone and from the core. The intermediate zone consists of fine-grained albite and quartz with scattered clusters of crystals 2 to 4 inches long in coarse-grained quartz, muscovite, and albite. The core is typically discontinuous and is composed of coarse -grained quartz and muscovite. The dike is broken by three small faults of slight displacement that probably formed during cooling.

Table 1. Micrometric analysis for beryl

Location of thin section	Total length of traverses millimeters	Number of thin sections	Millimeters	Beryl weight percent
Northwestern				
0.5 ft. foot border	117.08	2	1.02	0.87
2.- ft. footwall	54.88	1	0.00	0.00
6.- ft. central	101.83	2	0.28	0.28
2.- ft. hanging wall	54.27	1	0.56	1.03
0.5 ft. hanging border	197.56	3	0.90	0.46
Western				
0.3 ft. foot border	107.43	1	1.29	1.20
1.- ft. wall	84.85	1	0.97	1.14
4.- ft. central	92.04	1	1.29	1.40
4.- ft. intermed.	64.96	1	1.05	1.62
0.3 ft. hanging border	131.02	2	0.40	0.30
Eastern				
0.3 ft. border (east)	92.06	1	0.96	1.04
1.- ft. east wall	218.41	3	0.43	0.20
4.- ft. intermed.	143.46	2	0.00	0.00

Amd 11 01

FORM MF-103

WILLIAM A. REINKEN, ROBERT C. HORTON

252 West First Street
Reno, Nevada

REPORT OF INVESTIGATIONS Bureau of Mines, U.S. D. I.

FLOTATION OF BERYLLIUM ORES

Flotation of Beryl from the Errington-Thiel Property, Ruby Mountains, Nevada. (erroneously named) (R. O. Huddleston.)

The ore contained 1.03 percent beryllia and was mainly albite, orthoclase and microcline feldspars, and quartz, with appreciable beryl and muscovite and small amounts of hematite, apatite, spessaritie and zircon. Iron and manganese oxide stainings also were present in small amounts.

TABLE 17.- Flotation of beryl from the Errington-Thiel Property, Ruby Mountains, Nevada.

Metallurgical data

	Weight, percent	Analysis, percent BeO 1/	Percent of total BeO
Beryl Concentrate.....	8.30	11.10	84.4
Middling.....	14.82	.08	1.1
Tailing.....	60.20	.04	2.2
Slime.....	13.03	.75 (Total)	8.9
Mica.....	3.65	1.01 (12.98)	3.4
Composite.....	100.00	1.09 (?)	100.0

Operating data

Reagent	Pounds per ton of ore: Conditioner	Rougher	Cleaners 1	Cleaners 2
Hydrofluoric acid	9.2	-	-	-
Oleic acid	-	0.90	-	-
Frother B-24 2/.....	-	.16	-	-
pH.....	2.5 to 3.1	6.8	7.8	7.8
Time, minutes.....	30	4	3	1

1/ Beryllia analyses determined by fluorometric method.
2/ E. I. DuPont de Nemours & Co.

NOTE -----

The purpose of the Bureau of Mines research tests is to eliminate the waste of beryllium bearing ore in the old practice of hand-sorting, and make it possible to extract all the Beryllium content of the ore and waste material removed from a mine. The Bureau of Mines wanted samples with considerable gangue material for their research testing, from us. R. O. Huddleston sent the sample as requested, which was not representative, or of any particular dike. O.W.T.

Lease 1101

MINING LEASE AND OPTION

THIS LEASE, AND OPTION TO RENEW, made and entered into this 31st day of March, 1951, by and between ALMA T. ERRINGTON AND OSCAR W. THIEL of Elko County, Nevada, and ALMA T. ERRINGTON, AS Attorney in Fact for ELIZABETH E. SHAFFER, of Louisburg, Missouri, the parties of the first part, hereinafter called Owners, and ROBERT C. HORTON and WILLIAM A. REINKEN of WASHOE COUNTY, Nevada, hereinafter called Operators;

W I T N E S S E T H:

That the Owners, for and in consideration of the royalties hereinafter reserved and the covenants and agreements hereinafter expressed, and by the Operators to be kept and performed, hereby grants, demises and lets to the Operators all of those certain patented and unpatented mining claims, more particularly described in "Exhibit A" attached hereto and made a part hereof.

TO HAVE AND TO HOLD unto the Operators for the term of Thirty-five (35) years from the date hereof, unless sooner forfeited or determined by:

1. Sixty (60) days written notice given by the Owners to the Operators after the violation of any covenant made by or hereinafter against the Operators reserved; or determined by sixty (60) days written notice given by the Operators to the Owners after the violation of any covenant made by or hereinafter against the Owners reserved; a violation of any covenant by either Owners or Operators shall only be a violation sufficient to warrant termination of this lease, if said violation is not remedied and corrected by the violator within sixty (60) days after receiving notice of intention to terminate from the other party; any and all such notices shall be insufficient unless said notice specifically states the covenant violated and the manner in which it was violated and unless said notice is given within a reasonable time after the violation becomes known to the offended party.

CASTLE & PUCCINELLI
ATTORNEYS AT LAW
HENDERSON BANK BLDG.
ELKO, NEVADA

2. The Operators alone by the giving of written notice to the Owners of intention to terminate within sixty (60) days after the end of any one hundred (100) days period in which insufficient profit is made from the operation of the premises herein leased to make continued operation of said premises economically feasible.

Whenever this lease is terminated by the expiration of the term or by any of the methods expressly herein provided, all obligations of the Operators hereunder as to the future shall cease but the Operators shall not be released from obligation or liability incurred prior to such termination.

I.

The Owners hereby represent, certify and guarantee that they are the Owners of the aforesaid lode mining claims, subject only to the paramount title of the United States of America, and that said lode mining claims are properly monumented; that copies of location notices are properly poste d at the discovery cuts or shafts; and that the original location notices are of record as aforesaid; that all necessary assessment work and notices of intention to hold have been filed in relation to all of said mining claims as required by law; that all of said mining claims are in good standing and in full force and effect; and that there are no encumbrances or liens against said mining claims; and that the Owners have all such right, title and interest in the premises herein leased as is necessary to the effective making and performance of this lease and option.

II.

In consideration of the leasing by the Owners, the Operators make the following additional covenants and agreements, to-wit:

1. That they will, from the time they commence mining operations on the premises herein leased, do all of said mining and mining operations in a minerlike manner and in accordance with

CASTLE & PUCCINELLI
ATTORNEYS AT LAW
HENDERSON BANK BLDG.
ELKO, NEVADA

the laws of the State of Nevada, and that they will carry all insurance required by said laws and that they will otherwise comply with all federal, state and other laws or requirements in relation to the operation of the premises herein leased which may be enforced, including safety regulations.

2. That they will keep all shafts, drifts and other underground workings well and securely timbered and supported and shall not remove such timber and supports so as to endanger the ground or permit the same to cave or fall in, except that this covenant shall not be construed so as to prevent the Operators from removing timbering, filling in any stopes, shafts or other workings when such is convenient to the operations and in accordance with reasonable mining practices.

3. That they will allow the Owners, or their agents, to enter the premises herein leased for purposes of inspection and to examine the records of the operations of proper interest to the Owners at reasonable times and intervals.

4. That they will keep maps of the underground workings and will maintain accurate assay records, both of which will be open to examination in the manner provided in the preceding paragraph and two (2) copies of which may be had by the Owners on request.

5. That they will furnish all materials and supplies required for the operation, maintenance and reasonable repair of the mine, except that the Owners agree that the Operators may make full and reasonable use of the materials and supplies on the premises herein leased at the time of the commencement of the lease term.

6. That they will post a notice of non-liability of the Owners upon the premises herein leased and shall see that said notice is maintained thereon, and properly recorded.

7. That they will not suffer or permit any labor and/or mechanic and/or material liens or attachments or other liens to

CASTLE & PUCCINELLI
ATTORNEYS AT LAW
HENDERSON BANK BLDG.
ELKO, NEVADA

be filed against said premises, and that should any be so filed the Operators agree to cause said lien to be released within thirty (30) days of such filing unless Operators elect to contest such lien or attachment claiming it to be unjust and unfair; and, in the event of such contest and notice, the Operators agree that they will within thirty (30) days after final determination of such contest pay said lien in full and have it released of record.

8. That they will pay all taxes before delinquency which may be levied against all real property, improvements and personal property upon said mining claims and all taxes that may be levied upon unmined ore and all severance taxes.

9. That they will within six (6) months of the date of this lease commence mapping and exploration work upon the premises herein leased and will furnish the Owners with copies of all maps and all exploration reports made in regard to the premises herein leased.

10. That within one (1) year of the date of this lease agreement they will commence mining operations upon said premises and from that time forward will carry on mining operations at the mimimum rate of Four Hundred Eighty (480) eight-hour manshifts per year.

11. That they will supply the Owners with copies of all memoranda or other evidence of all sales of mineral products derived from the operation of the premises herein leased.

12. That they will file proofs of labor to cover annual assessment work on the premises herein leased and will otherwise maintain the claims herein leased in good standing. Copies of all proofs or other papers filed under this covenant shall be sent to the Owners by the Operators.

III.

In consideration of the payments hereinafter provided for and the covenants and agreements herein expressed, the Owners make the following additional covenants and agreements, to-wit:

CASTLE & PUCCINELLI
ATTORNEYS AT LAW
HENDERSON BANK BLDG
ELKO, NEVADA

1. That they will do nothing to interfere with the performance of the terms of this lease by the Operators.

2. That the Operators shall have the sole and exclusive use of any buildings, mills, machinery, engines, pulleys, shafting, and all other mining and milling equipment which may be on the premises herein leased at the time of the commencement of the lease term, but that the Operators will place any mill and machinery in operating condition at their own expense.

3. That in the event the Operators shall install machinery or equipment of any kind for use in any mill or any mine on the premises herein leased such additions shall be considered personal property of the Operators, but all repairs to buildings, machinery or equipment on the land at the time of the commencement of the lease term, title to which is in the Owners shall be considered as fixtures and become the property of the Owners.

4. That the Operators shall have the right to erect buildings and install machinery and equipment on the land as needed in the convenient operation of the mine and may remove such buildings, machinery and equipment at the expiration of the lease term or at any other time, such buildings, machinery and equipment at all times remaining the property of the Operators.

5. That the Operators, upon the termination of this lease, shall have four (4) months thereafter to remove all buildings, machinery, equipment and all other improvements placed therein or thereon by the Operators and which have not been previously removed.

6. That the Operators, as part of this lease, shall enjoy full use of any easements of way necessary or convenient to the operation of the premises herein leased and of any mill on said premises and which use it is within the powers of the Owners to allow, the use of such easements which the Owners hereby grant to the Operators for this lease term and any extension thereof.

CASTLE & PUCCINELLI
ATTORNEYS AT LAW
HENDERSON BANK BLDG.
ELKO, NEVADA

7. That the Operators shall have sole and exclusive use of all water appurtenant or upon said premises or developed thereon, including the use of all existing pipelines, ditches and water rights on or off the leased premises which have been or could be used in the working of the premises herein leased and of any mill on said premises and which use it is within the powers of the Owners to allow.

8. That said Operators shall be excused from performing the minimum shifts of work, mapping or exploration herein mentioned in the event of an act of God, war, public enemy, fire, or any other cause reasonably beyond the control of the Operators, or in the event work shall be prevented because of some government rule order, or regulation.

9. That the Operators have no duty to replace buildings, machinery, equipment, improvements, or property of any nature belonging to the Owners which may be lost or destroyed without the fault of the Operators, nor will the Operators be liable in any other manner for such loss or destruction which is without their fault.

10. That at any time the Operators at their own expense may proceed to patent any or all of said unpatented lode claims and that the Owners will make, constitute and appoint a nominee of Operators its true and lawful attorney-in-fact to proceed with patent applications and other proceedings in connection therewith.

11. That the Operators shall have the right at any time to cause said unpatented claims to be resurveyed and to amend the location notices so that the end lines may be parallel and the discovery cuts or shafts will not be over three hundred (300) feet from each of the side lines. It shall be the endeavor of the Operators in amending said claims not to abandon any of the areas embraced in said mining locations and if on the resurvey and amendment any vacant ground be found within the exterior boundary lines projected to meet that then the Operators shall have the right to

CASTLE & PUCCINELLI
ATTORNEYS AT LAW
HENDERSON BANK BLDG.
ELKO, NEVADA

locate such vacant areas for the mutual benefit of the parties hereto, the title to rest in the Owners according to the terms of this agreement and lease, to all of which the Operators hereby expressly agree.

12. To occupy and hold all cross or parallel lodes, spurs, or mineral deposits of any kind which may be discovered by the said Operators or any persons under them in any manner, by working within or from the demised ground so that the said property shall become and be the property of the said Owners, but with the privilege of the said Operators of working the same as part and parcel of said demised premises.

13. Any and all mills, machinery or equipment erected upon or used in or upon the premises herein leased may be used to process minerals and ores derived from the operation of premises other than those herein leased and all rights and privileges granted to the Operators by the Owners in this agreement convenient to such processing may be used by the Operators to facilitate such processing.

IV.

The Owners and the Operators both mutually covenant and agree as follows, to-wit:

1. That all notices provided for in this mining lease ~~and~~ shall be given in writing personally or by registered mail and addressed to the Owners as follows -

Alma T. Errington
c/o Castle & Puccinelli
Attorneys at Law,
Elko, Nevada

and addressed to the Operators as follows:-

Horton & Reinken
c/o United Engineers
252 W. 1st St.
Reno, Nevada

The addresses above set out may be changed by giving written notice thereof to either party.

2. That should any dispute arise between Owners and Operators under this agreement that such dispute shall be submitted to ar-

CASTLE & PUCCINELLI
ATTORNEYS AT LAW
HENDERSON BANK BLDG.
ELKO, NEVADA

bitration, Owners appointing one (1) arbitrator, Operators appoinging one (1) arbitrator, and the two (2) so selected appointing a third arbitrator, and the majority of the arbitrators so selected shall make an award finally settling such dispute, and each of the parties hereto agree that they will abide by and perform such award. The parties hereto further agree that no suit or other legal action may be maintained by either party until the dispute has been arbitrated as set forth in this paragraph.

3. That the fact a part of or one or more of the clauses of this mining lease and option shall be unenforceable or illegal shall in no way affect the enforceability, validity or legality of any other part of this mining lease.and

V.

1. The Operators promise to pay to the Owners a royalty of Eight (8%) per cent on all concentrates, mica or other ores produced by said Operators in the operation of any mill or plant or in any other treatment or reduction of any ores mined in connection with this lease, which royalty shall be based upon the net value of the mill product sold as shown by the settlement sheets therefor, after deducting mining, milling and transportation charges. Payment of said royalties to be made to the said Owners by depositing the same in the name of Alma T. Errington, in The First National Bank of Nevada, Elko Branch, for the benefit of the said Owners. That pending the payment of the royalties above specified, said Operators hereby agree to pay to the order of the said Owners, the sum of THREE HUNDRED AND NO/100 ($300.00) DOLLARS, per month, beginning with the 1st day of May, 1951 and continuing until the mines and mining premises are in operation, and concentrates, mica or other ores are being mined, milled and sold. Said payments to be made to the name of Alma T. Errington, in the First National Bank of Nevada, Elko Branch, to the credit of the said Owners, as above set forth.

CASTLE & PUCCINELLI
ATTORNEYS AT LAW
HENDERSON BANK BLDG.
ELKO, NEVADA

2. That the said Operators will not assign this lease or any interest hereunder or sublet said premises or any part thereof, without the consent of the said Owners being first had in writing.

3. It is understood and agreed that the Operators shall have the right to renew this lease for a similar term herein granted upon giving the Owners a notice in writing of their intention so to do at least Sixty (60) days before the expiration of the within lease. Terms and conditions of said renewal lease to be agreed upon at the time the said renewal is granted.

4. To deliver to the said Owners, the said premises with the appurtenances and all improvements in good order and condition with all drifts, shafts, tunnels and other passages entirely clear of loose rock and rubbish and the mine ready for immediate and continued working without demand or further notice, upon the termination of this agreement from any cause whatever. All buildings, appurtenances and equipment placed upon said property by said Operators may be removed by said Operators at the termination of this lease and shall not become a part of the real property.

15. Each and every clause and covenant of this agreement shall extend to the heirs, executors, administrators and lawful assigns of all parties hereto.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands the day and year first above written.

Alma T. Errington
Alma T. Errington

Oscar W. Thiel
Oscar W. Thiel

Elizabeth E. Shaffer
Elizabeth E. Shaffer

By Alma T. Errington
Alma T. Errington
Attorney in Fact.
Lessors

Robert C. Horton
Robert C. Horton

William A. Reinken
William A. Reinken

Lessees

STATE OF NEVADA)
) SS.
COUNTY OF ELKO)

On this 31st day of March, 1951, before me, the undersigned, a Notary Public in and for said County and State, personally appeared,-ALMA T. ERRINGTON, a single woman, OSCAR W. THIEL, and ALMA T. ERRINGTON, as Attorney in Fact for ELIZABETH E. SHAFFER,-known to me to be the persons described in and who executed the foregoing instrument, and who acknowledged to me that they executed the same freely and voluntarily and for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first hereinabove written.

D. J. Castle
NOTARY PUBLIC
My commission expires: 2/18/54

STATE OF NEVADA)
) SS.
COUNTY OF WASHOE)

On this 18 day of ~~March~~ April, 1951, before me, the undersigned, a Notary Public in and for said County and State, personally appeared,-ROBERT C. HORTON, and WILLIAM A. REINKEN,-known to me to be the persons described in and who executed the foregoing instrument, and who acknowledged to me that they executed the same freely and voluntarily and for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year ~~in~~ this certificate first hereinabove written.

Royal A. Stewart
NOTARY PUBLIC
My commission expires: Oct 30, 1953

"EXHIBIT A"

The lode mining claims, the subject of the foregoing lease and option, together with the dates of location and the recordation thereof are hereby described as follows, to-wit:

Those certain mines, lode mining claims and mining premises, situated in an unorganized mining district in Ruby Valley, which are named:

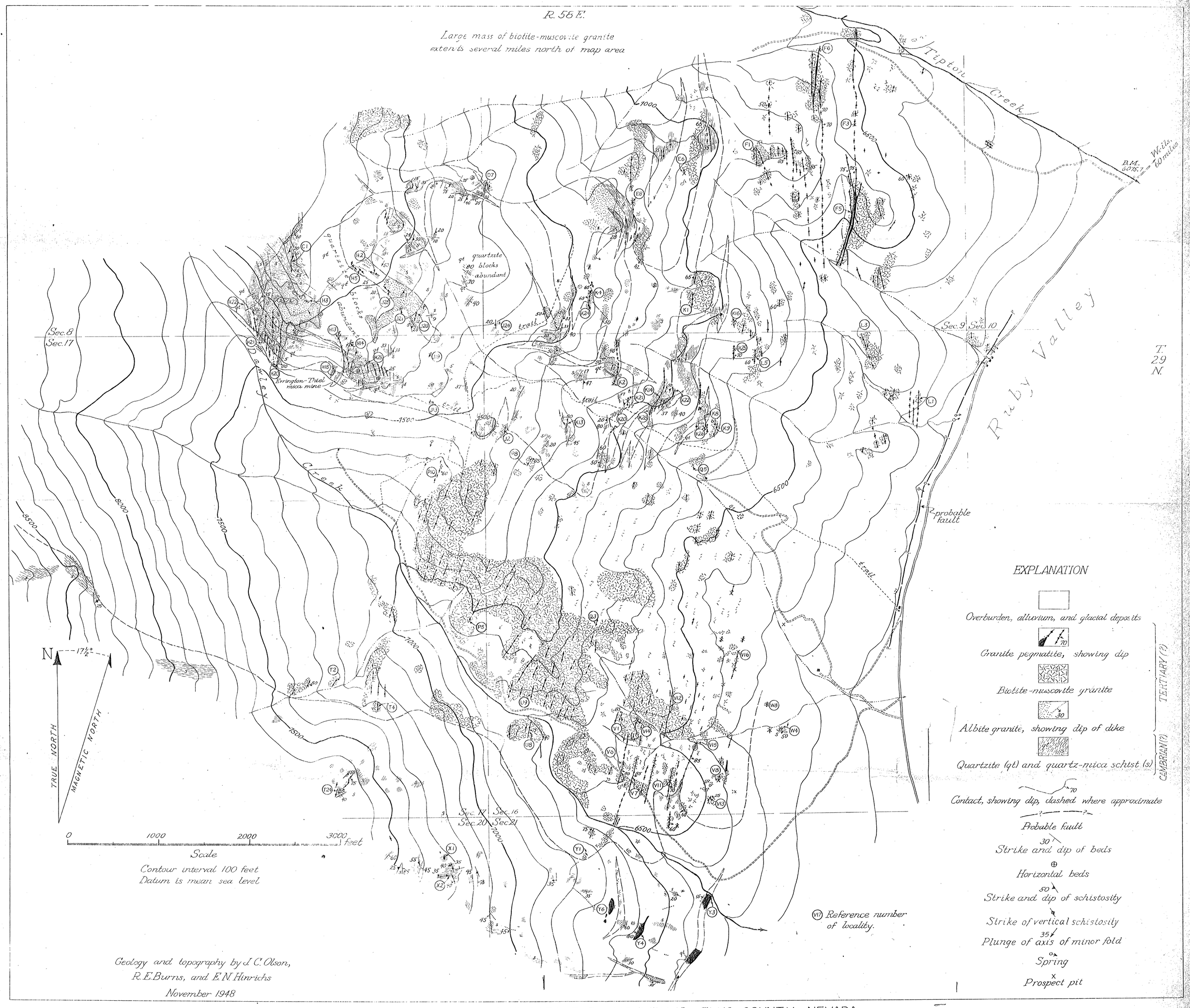
NAME	DATE OF LOCATION	RECORDED BOOK M/L	PAGE
White Rock Peak,	August 20, 1931	22	431
White Rock Peak #1	May 10, 1931	22	641
White Rock Peak #2	May 10, 1931	22	641
White Rock Peak #3	May 10, 1931	22	642
White Rock Peak #4	August 24, 1931	22	643
Mica & Beryl #2	August 24, 1931	22	644
Mica & Beryl #4	August 10, 1931	22	428
Mica & Beryl #5	August 10, 1931	22	429
Mica & Beryl #6	August 10, 1931	22	429
Mica & Beryl #7	August 10, 1931	22	430
Mica & Beryl #8	September 22, 1931	22	448
Beryl #1	May 11, 1940	26	297
Beryl #2	May 11, 1940	26	280
Beryl #3	May 11, 1940	26	280
Beryl #4	May 11, 1940	26	297
Beryl #5	May 11, 1940	26	298
Beryl #6	May 11, 1940	26	281
Beryl #7	May 11, 1940	26	281
Beryl #8	May 11, 1940	26	298
Beryl #9	May 11, 1940	26	298-299
Beryl #10	May 11, 1940	26	299
Beryl #11	May 11, 1940	26	299-300

NAME	DATE OF LOCATION	RECORDED BOOK M/L	PAGE
Beryl #12	May 29, 1940	26	300
Beryl #13	May 29, 1940	26	300-301
Beryl #14	May 11, 1940	26	265
Beryl #15	May 16, 1940	26	265-266
Beryl #16	May 16, 1940	26	266
Beryl #17	May 16, 1940	26	266-267
Beryl #18	May 16, 1940	26	267
Beryl #19	May 16, 1940	26	267-268
Beryl #20	May 16, 1940	26	268
Beryl #21	May 16, 1940	26	268
Beryl #22	May 16, 1940	26	269
Beryl #23	May 16, 1940	26	269
Beryl #24	May 16, 1940	26	270
Beryl #25	May 28, 1940	26	281-282
Beryl #26	May 28, 1940	26	282
Beryl #27	May 28, 1940	26	282-283
Beryl #28	May 28, 1940	26	283
Beryl #29	May 28, 1940	26	283-284
Beryl Millsite	May 14, 1940	26	265
Mica Beryl #1	July 1, 1941	26	522-523
Mica Beryl #2	July 1, 1941	26	523
Mica Beryl #3	July 1, 1941	26	523-524
Mica Beryl #4	July 1, 1941	26	524
Mica Beryl #5	July 1, 1941	26	524-525
Mica Beryl #6	July 1, 1941	26	525
Mica Beryl #7	July 1, 1941	26	525-526
Mica Beryl #8	July 1, 1941	26	526
Mica Beryl #9	July 1, 1941	26	526-527
Mica Beryl #10	July 1, 1941	26	527
Mica Beryl #11	July 1, 1941	26	528

NAME	DATE OF LOCATION	RECORDED BOOK M/L	PAGE
Mica Beryl #12	July 1, 1941	26	528
Mica Beryl #13	September 15, 1941	26	553
Mica Beryl #14	September 15, 1941	26	554

The Operators hereby agree to grant the Owners the sole and exclusive use of the Beryl Nos. 1, 2, 3, 4 and 9 lode mining claims hereinabove mentioned for their sole and exclusive use as and for domestic purposes.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



THE DAWLEY CANYON PEGMATITE AREA, RUBY MOUNTAINS, ELKO COUNTY, NEVADA