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

200 New Customhouse
Denver 2, Colorado

March 3, 1952

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
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Memorandum

To: DMRA Field Team, Region IV

From: A. H. Koschmann

Subject: DMA Docket 2046, The Barite Corporation, Goshute Quartz Crystal Deposits, Goshute Indian Reservation, Juab County, Utah

Enclosed are eight copies of the geologic report by R. J. Roberts, J. W. Hasler, and B. J. Sharp, of the U. S. Geological Survey covering the above docket. It has been recommended that the loan be approved.

The U. S. Bureau of Mines will not submit an engineering report.

The brochure is enclosed.

A. H. Koschmann
A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (8)
and brochure

Room 208, 222 So. West Temple
Salt Lake City 1, Utah
29 February 1952

Memorandum

To: A. M. Koschmann, Field Team, Region IV

Subject: DMA Docket 2046, The Barite Corporation, Goshute Quartz Crystal Deposits, Goshute Indian Reservation, Juab County, Utah.

Enclosed are eight copies of a geologic report of the Goshute Quartz Crystal deposit on the Goshute Indian Reservation, Juab County, Utah, under lease by the Barite Corporation, Idaho Falls, Idaho.

The piezoelectric quartz that has been mined is in a pegmatite dike that cuts quartz monzonite. The pegmatite has yielded considerable quartz that may meet Signal Corp specifications.

Several other quartz-bearing pegmatites and veins are known throughout the area, but so far no quartz of piezoelectric quality has been discovered from these other deposits.

A limited exploration program has been outlined with the applicant to obtain preliminary geologic data, and to thoroughly explore the area. Exploration will be by bulldozer trenching and by digging test pits on all locations favorable for the occurrence of quartz crystals of piezoelectric quality, and by extending the present shaft an additional 30 feet.

It is concluded that there is a fair chance of finding additional deposits of piezoelectric quartz in the Goshute Quartz mine property, and it is therefore recommended that the Defense Minerals Exploration Administration enter into a contract with the applicant to do the proposed work herein outlined. The total cost of the project is $8,187.24. On a 90-10 percent participation basis, the government's share will be $7,364.01.

There was no field team request for an engineering report by the U. S. Bureau of Mines, however, they aided materially in outlining the exploration costs.

I concur with the recommendations of the examining geologists.

J. William Mauler
For - Ralph J. Roberts

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

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

Project DMA 2016, The Barite Corporation

Goshute Quartz Crystal Deposits

Goshute Indian Reservation

Juab County, Utah

R. J. Roberts, J. W. Hasler, and R. J. Sharp
Geologists
U. S. Geological Survey

February 29, 1952

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Figure 1. Index map of Western Utah.

Figure 2. Sketch map of workings, Geolite Quartz mine, Juab County, Utah.

Docket DMA 2016, The Barite Corporation

Goshute Quartz Crystal Deposits

Goshute Indian Reservation

Juab County, Utah

INTRODUCTION

The Goshute Quartz deposit was visited August 18 and 19 by George Ryunter of the Conservation Branch, U. S. Geological Survey, Hugh Wanamke, Signal Corps, and Ralph J. Roberts, Mineral Deposits Branch, U. S. Geological Survey, to evaluate the deposits as a possible source of piezoelectric quartz. The deposits were again visited October 30 - November 1 by J. William Boeler and Byron J. Sharp of the U. S. Geological Survey in response to a request for a field examination by the Field Team, Region IV, Defense Minerals Administration.

Location and Accessibility

The Goshute Quartz deposit is in Juab County, Utah, on the west flank of the Deep Creek Range (fig. 1) 76 miles by road south of Wendover, Utah. The property can be reached by travelling 27 miles south from Wendover, U. S. Highway 50, then turning southeastward for 32 miles to Ibapah, Utah, then continuing 15 miles southeastward to the property. The workings are at an altitude of about 7,700 feet on the north side of Dacs Creek and on the long ridge east of the Queen of Sheba Mine, which is south of the quartz crystal property.

History and production

Quartz showings were first discovered by Frank Steele in 1940 when he noted quartz and beryl crystals in float. A pit three feet deep was dug on the discovery site and the crystals were piled nearby on the dump. From time to time crystals from the property were exhibited at fairs and made available to collectors, but none were sold. In 1950 the property was brought to the attention of Ralph Gunns and L. A. Clemson of Idaho Falls, Idaho, and they, together with their associates in the Burite Corporation, began negotiations to obtain a lease on the property.

A lease was signed on September 14, 1950, but mining operations were not begun until 1951. During April, 1951, 2,617 pounds of quartz was removed from the property, and during May, 1951, 4,116 pounds were removed. Of these shipments, one crystal weighing 35 pounds and 2 ounces was sold to the Applied Physics Company, Pasadena, California for $300.00. The remainder was sent to Idaho Falls and was there cobbed. Negotiations were being carried on during August, 1951 with the General Services Administration concerning the purchase of the cobbed material which is estimated to weigh about 500 pounds.

It is reported that much valuable crystal was removed from the workings and destroyed by unauthorized persons during April and May, 1951. Estimates of the value of the crystal that was destroyed are as much as $20,000, but this figure may be high.

No quartz was mined from the main workings during June or July, 1951, but some trenching was done on outlying prospects. A few quartz crystals were found, most of which were milky. Some fragments of clear quartz were observed in the float.

GEOLOGY

The area is underlain by quartz monzonite which is cut by pegmatite and quartz veins. A few miles to the south and north the quartz monzonite is in contact with sedimentary rocks presumed to be of Paleozoic age. Quaternary alluvium flanks the range on the west.

The quartz monzonite is a coarse grained, light, pinkish gray porphyritic rock. The phenocrysts are principally potash feldspar in a groundmass of quartz, plagioclase, biotite, and hornblende. The quartz monzonite is remarkably uniform throughout the area examined. It forms craggy outcrops and the west face of the range is extremely precipitous.

The pegmatite dikes are generally small, ranging from a few inches to 8 feet wide, and are a few tens of feet long. Potash feldspar, probably orthoclase, plagioclase, muscovite, and quartz are the principal minerals; accessory garnet, pyrite, and beryl are present locally.

The pegmatites are zonal; commonly they are composed of a graphic granite outer zone and a quartz-potash feldspar-plagioclase-muscovite inner zone. The large radio quality quartz crystals are generally in the central part of the inner zone. Graphic granite forms the wall of the Geshute quartz-bearing pegmatite in places.

The quartz veins that locally cut the quartz monzonite appear to be related to the pegmatites in that they contain some feldspar, and the quartz is generally milky, similar to the quartz crystals in the pegmatites. Locally, however, the quartz shows comb structure, and some minute relatively clear crystals were noted.

Beryl is a notable accessory mineral reported from some of the pegmatite dikes in the Geshute Reservation area. The crystals of beryl are commonly

small, ranging from a fraction of an inch to 3 inches in diameter, and specimens as much as 8 inches long are reported.

QUARTZ DEPOSITS

The quartz deposit that has been explored is shown on figure 2 and plate 1. Another prospect pit was visited south of the main pit on the long ridge immediately north of the mouth of Sheba Mine.

The radio quality quartz that has been mined was found in a lenticular body of pegmatite about 35 feet long and as much as 8 feet wide (fig. 2). The quartz crystals were in the inner zone of the pegmatite in a matrix of potash feldspar, plagioclase, fine-grained quartz, and locally, muscovite. The quartz crystals are commonly milky and a few are smoky. Most of the crystals containing clear quartz have been removed or broken, but it is inferred that the clear parts were principally on the pyramidal termination. Some crystals are reported to have been nearly all clear quartz with only small imperfections such as veils, inclusions, and shadows. The crystals range from a fraction of an inch to 5 feet long and were as much as 3 feet in diameter. The largest crystal actually sold to date weighed 35 pounds 2 ounces.

Most of the crystals remaining in the pit are valueless because they are milky quartz or are broken. The pegmatite is said to have narrowed downward at the bottom of the pit, and may have pinched out. Quartz crystals are exposed on the northwest and southeast walls of the pit, but the pegmatite narrows in these directions beyond the pit and grades laterally into feldspar-quartz intergrowths. The quartz-bearing sheet may end in a few feet from the present pit.

The prospect pit to the south on the north side of a long ridge north of the Queen of Sheba mine was a shallow pit only 2 1/2 feet deep and 36 inches wide. The quartz exposed was in large crystals and most of them were milky. A lamprophyre dike trending northeast cuts through the prospect pit forming a footwall, with the quartz and pegmatite trending southeast. The pegmatite weathers easily and consequently forms very poor outcrops. The country rock around this pit is a coarse grained gray granite cut by small pegmatite dikes that trend south-southeast. The pegmatite dikes which are bordered by graphic granite, contain coarse grained orthoclase crystals, quartz and tourmaline and a very few beryl crystals. These pegmatite dikes range in size from 1 inch to as much as 18 inches wide and appear to be quite lenticular along their strike.

A considerable amount of quartz crystal float was found below the pit. Most of the quartz was milky, but several clear crystals were found. The abundance of good quartz crystal float seems to warrant further exploratory work on this ridge as well as on other reported occurrences along the west flank of the Deep Creek range.

QUARTZ RESERVES

Although a few quartz crystals remain in the walls of the pit, there are no minable reserves of quartz. The remaining crystals are either milky or are fractured and are therefore valueless.

The outlook for the discovery of usable crystals in the vicinity of the main prospect pit is not too promising as the pegmatite pinches out at the surface. Crystals can be found at depth below the bottom of the pit and

along the strike of the pegmatite, but they are enclosed in extremely hard rock and the blasting necessary to explore the pegmatite would probably break most of the crystals.

No minable reserves of quartz crystal can be calculated from the present meager showings, but there is enough quartz crystal float and vein quartz throughout the various prospect pits to warrant some exploratory work.

PROPOSED EXPLORATION

The Barite Corporation officials have applied for an exploration loan of $25,000 to prospect various showings of quartz crystals on the Goshute Indian reservation, Juab County, Utah.

An exploration program to explore each occurrence of quartz crystal in the area covered by the mining lease has been outlined with the applicant.

The exploration program will be carried out under the supervision of a consulting geologist and mine superviser provided for under the contract. They will supervise such shaft work on the original discovery as is deemed necessary to prove or disprove the occurrence of more quartz crystals beyond the bottom of the present shaft, and will also supervise bulldozer trenching and the sinking of test pits to thoroughly explore all the present occurrences of quartz crystal and any additional discoveries that might be made during the period of exploration.

A limited exploration program has been outlined with the applicant to obtain preliminary geologic data, and to thoroughly explore the area by bulldozer trenching and by digging test pits on all locations favorable for occurrence of quartz crystals of piezoelectric quality.

The proposed project for the Geshute Quartz property is divided into three parts: (1) bulldozing, (2) test pits at favorable stripped locations, and (3) timber 20 feet of existing shaft and extend the shaft an additional 20 feet. The exploration costs are as follows:

1. Bulldozing and stripping

Contract - 120 hours @ $12.00 per hour	$1,440.00
Drayage	300.00
	$1,740.00

2. Test pits

(12 pits. Two men can complete a pit in three shifts.) A total of 18 days to complete test pit work.

Labor per shift

2 miners @ $15.00 per 8-hr. shift including insurance, OAB, etc.	30.00
2 muckers @ $13.50 per 8-hr. shift including insurance, OAB, etc.	27.00
Supervision - $540 per month, $20.00 per shift	20.00
Geologist $50.00 per day, prorated	25.00
Total	$ 102.00
Total labor to complete 12 pits - 18 x $102.00	$1,836.00

Supplies for test pits

Explosives (powder, fuse, caps)	150.00
Steel 10 sets - 1', 2', 3'	100.00
Miscellaneous hand and blacksmith tools	150.00
Transportation	175.00
	$ 575.00

Total cost of test pits

Labor, 18 shifts	$1,836.00
Supplies	575.00
	$2,411.00

3. **Timber shaft and extend shaft an additional 20 feet**

Labor per shift

2 miners @ $15.00 per 8-hr. shift including insurance, OAB, etc.	30.00
2 muckers @ $13.50 per 8-hr. shift including insurance, OAB, etc.	27.00
Supervision - $540 per month, $20.00 per shift	20.00
	$ 77.00
10 shifts required to timber shaft - labor 10 x $77.00	770.00

Supplies for timbering shaft

4 M bd. feet of timber @ $100	400.00
Miscellaneous	75.00
Total	$ 475.00

Total cost of timbering first 20 feet of shaft

Labor	$ 770.00
Supplies	475.00
Total	$ 1,245.00

Extension of shaft 20 feet

It is estimated that a 4-man crew will be able to drill, blast, muck, and timber 3 feet in 2 shifts, or 20 feet in 14 shifts, therefore advance per shift will be 1 1/2 feet.

Cost per 1 1/2 feet of advance is estimated as follows:

2 miners @ $15.00 per 8-hr. shift including insurance, OAB, etc.	$ 30.00
2 muckers @ $13.50 per 8-hr. shift including insurance, OAB, etc.	27.00
Supervision, $640 per month, $20.00 per shift	20.00
Geologist, $50.00 per day prorated	12.50
Explosives (powder, fuse, caps)	8.00
Power (gas and lub. for compressor and hoist)	10.00
Timber	5.00
Transportation	7.50
Pipe, 2" - 100' (2 lines - pump discharge and air line)	2.75
Steel and bits	6.75
Equipment rental	26.66
Miscellaneous	7.50
Cost per shift	$ 163.66
Cost of shaft sinking 14 x $162.16	$2,292.24

Sumlica

Explosives (powder, fuse and caps)	$ 112.00
Power (gas and lubricants for compressor and hoist)	140.00
Timber	70.00
Pipe	38.50
Steel and bits	94.50
Miscellaneous	105.00
Total	$ 560.00

Equipment Rental

Gasoline driven compressor and hoist	$ 500.00 per mo.
Pickup truck	300.00 per mo.
Air driven water pump	50.00 per mo.
Jackhammer, air hose, pressure tank	150.00 per mo.
	$1,000.00

Labor

2 miners @ $15.00 per 8hr. shift including insurance, OAB, etc.	$ 30.00
2 muckers @ $13.50 per 8-hr. shift including insurance, OAB, etc.	27.00
Supervision, $540 per month, $20.00 per shift	20.00
Geologist $50.00 per day prorated	12.50
Total	$ 89.50

Facilities

Three tent covered wood platforms will be sufficient to accomodate the employees. Estimated cost of this facility is	$ 300.00

Summary of Project Costs

Project 1	$2,740.00
Project 2	2,411.00
Project 3	
Timber shaft	1,245.00
Extend shaft 20 feet	2,291.24
Facilities	300.00
	$8,187.24

Estimated total time - 2 months

CONCLUSIONS AND RECOMMENDATIONS

The piezoelectric quartz that has been mined is in a pegmatite dike that cuts quartz monzonite. The pegmatite has yielded considerable quartz that may meet Signal Corps specifications, but the easily obtained material has been mined out. The pegmatite may contain clear quartz at depth, but the enclosing rock is hard and it is unlikely that crystals can be mined without fracturing them.

Several other quartz-bearing pegmatites and veins are known throughout the area, but so far no quartz of piezoelectric quality has been discovered. A comprehensive prospecting program might well reveal piezoelectric quartz in some veins. Such a program may prove costly, but because of the present national demand for piezoelectric quartz, it is felt that at least the known quartz-bearing pegmatites in the area should be thoroughly explored.

The Bowite Corporation officials have applied for an exploration loan of $25,000 to prospect the various shendings of quartz crystals. A limited exploration program has been outlined with the applicant to obtain preliminary geologic data, and thoroughly explore the area by bulldozer trenching and by digging test pits on all locations favorable for the occurrence of quartz crystals of piezoelectric quality. It is concluded that there is a fair chance of finding additional deposits of piezoelectric quartz in the Gonzales Quartz mine property, and it is therefore recommended that the Defense Minerals Exploration Administration enter into a contract with the applicant to do the proposed exploration work herein outlined. The total cost of the project is $8,182.24. On a 90-10 percent participation basis the government's share will be $7,364.02.

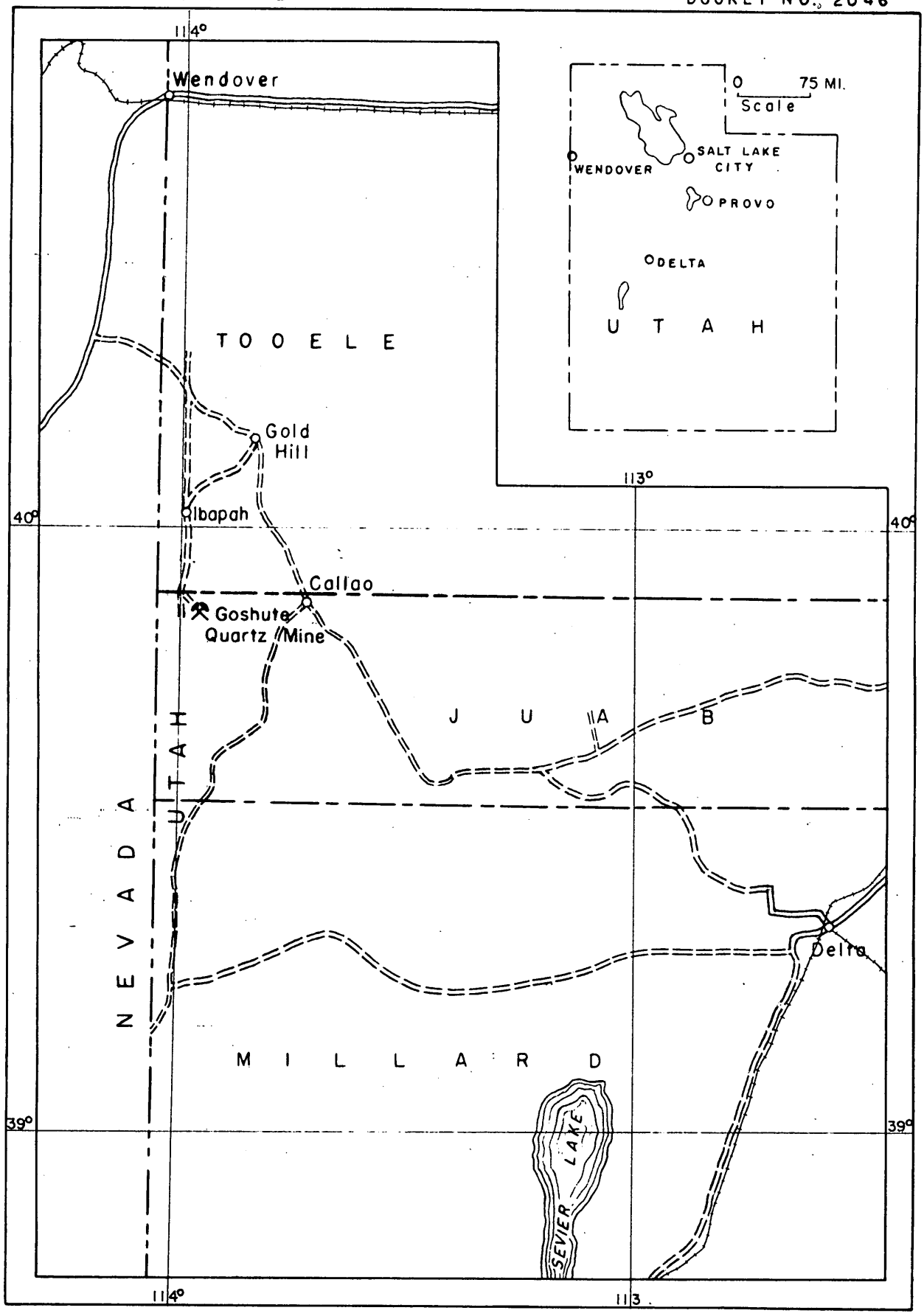
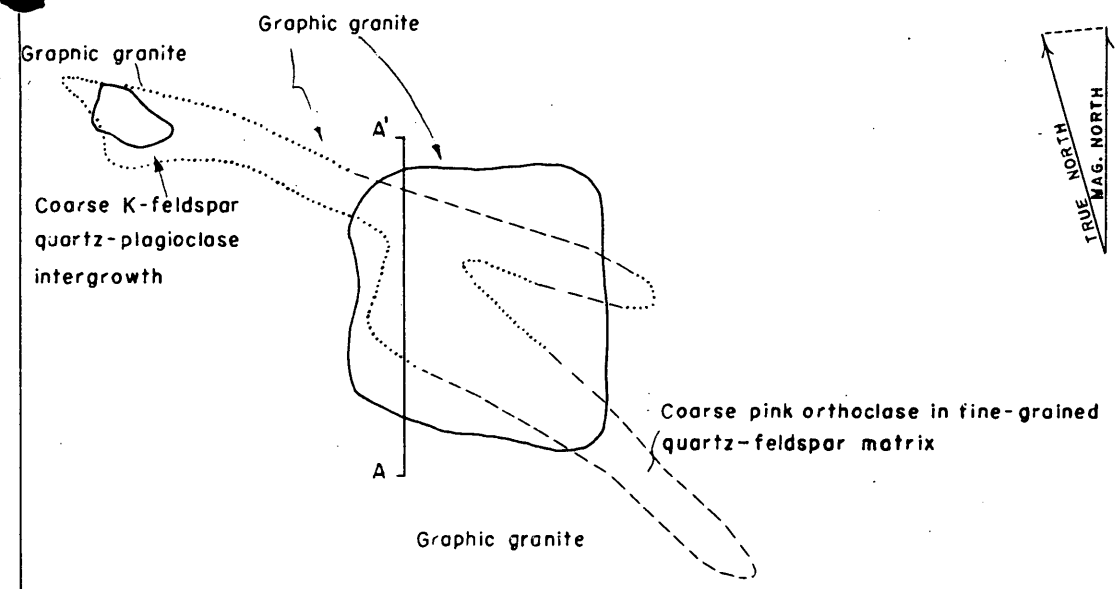
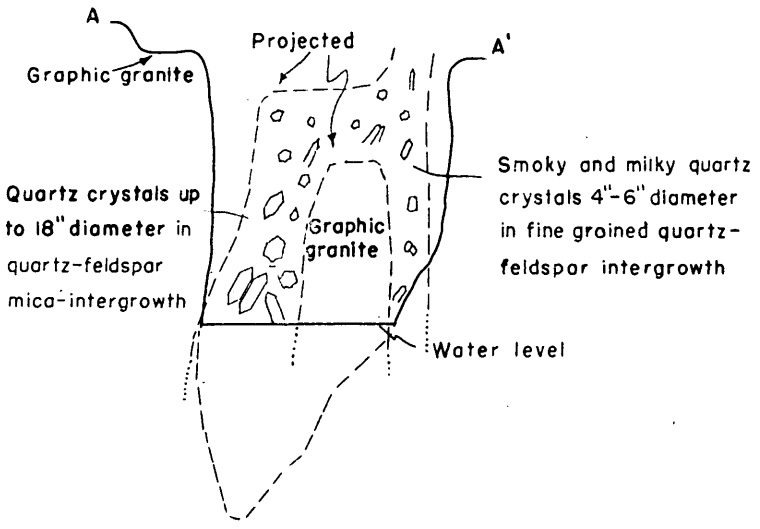


FIG. 1 INDEX MAP OF WESTERN UTAH

0 5 10 15 20 MILES
Scale





Section along line A-A'

Ralph J. Roberts
August, 1951

FIG. 2 SKETCH MAP OF THE WORKINGS, GOSHUTE QUARTZ MINE
JUAB COUNTY, UTAH

0 10 20 FEET
Scale