Building 20 - Federal Center
Denver 25, Colorado

January 26, 1961

Memorandum

To: George C. Selfridge, Chief
Division of Field Operations, OME
Washington 25, D. C.

From: Hugh M. Connors, Acting Field Officer, OME, Region III

Subject: Docket No. OME-6105 (Copper-Lead-Zinc-Bismuth)
Index-Daley Mines Company
(Creole mine)
Beaver County, Utah

Enclosed are the original and two copies of a report dated January 26, 1961 by T. M. Romslo, mining engineer.

The field examiner recommends, and I concur, that the Applicant's request for aid in exploration of the Creole deposit be denied. A commitment by the Applicant to do certain work, not of a true exploration nature, before making his application for OME assistance is, indeed, unfortunate.

Original signed by

Hugh M. Connors

Attachments
HMC/lm
cc Chief, Division of Field Operations, OME (2 w/original)
Docket OME-6105
DMR-DFC
S. R. Wilson
Chron

UNITED STATES
DEPARTMENT OF THE INTERIOR
STEWART L. UDALL, SECRETARY

OFFICE OF MINERALS EXPLORATION
REGION III

OME-6105

Index-Daley Mines Company

Creole Mine

Beaver County, Utah

Copper-Lead-Zinc-Bismuth

Examination Report

by

T. M. Romslo, Mining Engineer, Bureau of Mines

January 26, 1961

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OME-6105

INDEX-DALEY MINES COMPANY
CREOLE MINE
BEAVER COUNTY, UTAH

INTRODUCTION AND SUMMARY

Index-Daley Mines Company applied to the Office of Minerals Exploration for aid in exploration for copper, zinc, lead and bismuth in the Creole Mine, Beaver County, Utah. The application, a replacement of Docket No. OME-6098 submitted and withdrawn by the Heinecke Brothers, was received and assigned Docket No. OME-6105, October 27, 1960. It was forwarded to the Acting Field Officer, Region III, with comments by the Review Committee's Chairman, for field investigations and recommendations.

The Applicant proposed to test for an extension of a replacement type deposit at a quartz monzonite-limestone contact. The proposed project involved driving a 1500-foot adit and a 200-foot raise at an estimated total cost of $71,995.00. During November 1960, the Applicant verbally requested that the proposed project be revised to include 440 additional feet of adit to test for extensions of veins indicated by outcrops. The estimated total cost of the revised project is $90,629.00.

The field investigations were made December 6, 1960 by T. M. Hemslo, U.S.B.M., accompanied by George A. Rich, the Applicant's field superintendent.

The Creole mine has been worked intermittently since 1907. Known production included 200 tons of low-grade iron ore, 200 tons of tungsten

ore which occurred only at the surface, and about 9000 tons of copper-zinc-bismuth ore. At the present time, mining and milling operations are conducted by Heinecke Brothers and the Index-Daisy Mines Company has started work on the proposed adit specified in the application for Governmental assistance.

The deposit occurs along a limestone-quartz monzonite contact and has been worked to an incline depth of about 170 feet. Below a shallow oxide zone, sulfides of copper, zinc and bismuth occur as pods and lenses in the more highly altered limestone.

Exploration of the deposit from underground workings would have a fair chance of finding significant amounts of ore. Favorable targets are possible extensions to the west and with depth, and a possible unexplored zone between the mine workings and the quartz monzonite.

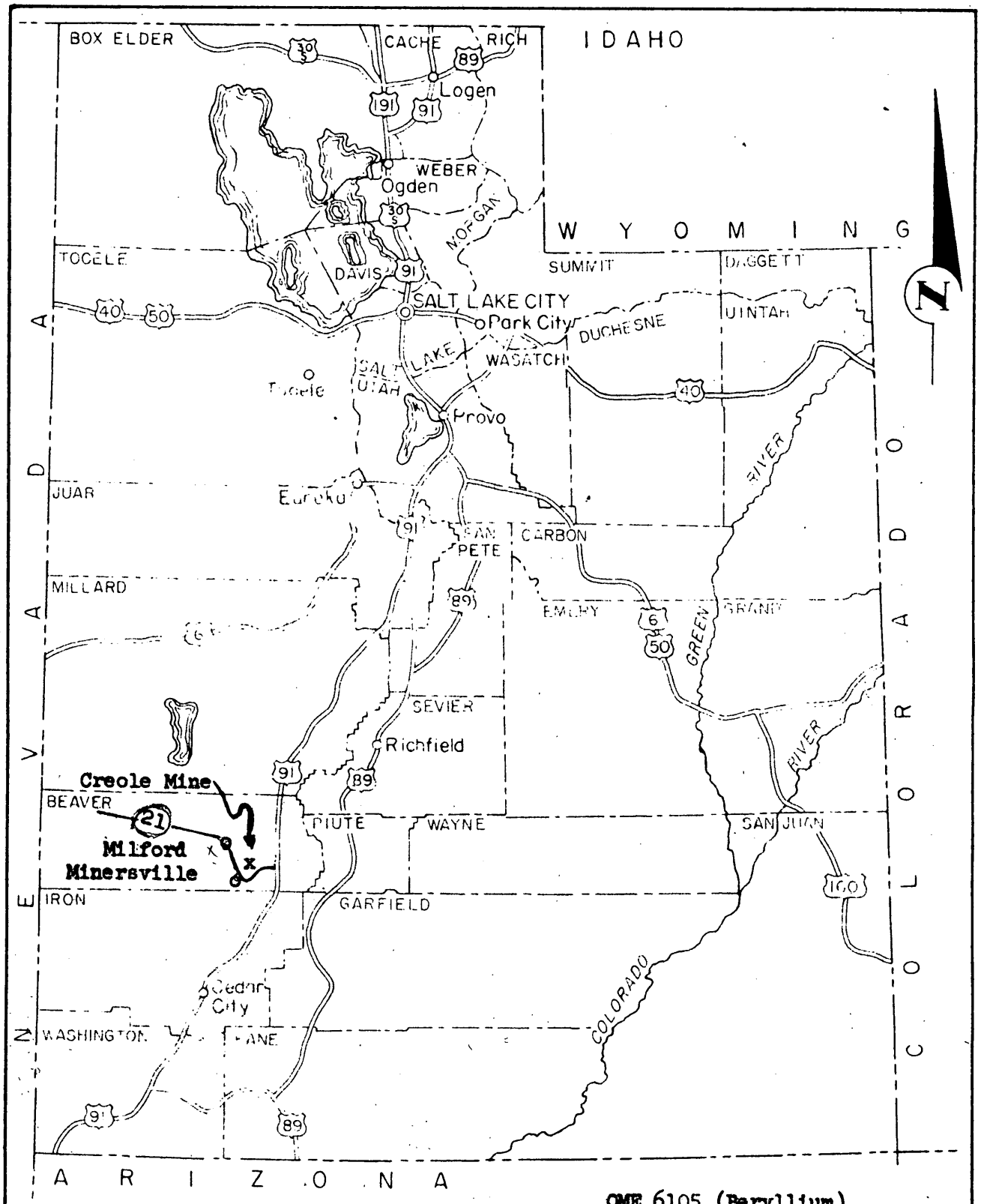
The request for aid should be denied because only a minor portion of the proposed work is concerned with exploration and because, the Applicant, being obligated to complete the major portion of the proposed work, is not interested in a realistic exploratory program for financial reasons.

LOCATION, ACCESSIBILITY AND PHYSICAL FEATURES

The Creole mine is situated about 5 miles northeast, by gravel roads, of Minersville, Beaver County, Utah, in Secs. 20, 21, 28 and 29, T. 29 S., R. 9 W., S. L. B. and M. (fig. 1). Minersville, a village, is approximately 13 miles southeast via State Highway No. 21 from Milford, the nearest town and railroad shipping point.

The property lies at an average altitude of about 6400 feet on the southwest extremity of the Mineral Mountain Range. The dominant topographic feature of the area is southwesterly trending ridges that rise a few hundred feet above the intervening canyons. Slopes of the ridges are moderately steep and are covered with light growths of sagebrush and juniper.

There are no permanent streams in the mine area. The principal nearby drainage channel is the southwesterly trending Lincoln Gulch. A spring in the gulch about one-half mile north of the mine is the source of water for the concentrator and the mine.



OME 6105 (Beryllium)

Fig. 1 LOCATION MAP, INDEX-DALEY MINES CO.
CREOLE MINE
BEAVER COUNTY, UTAH

0 50 100
SCALE OF MILES

HISTORY AND PRODUCTION

The Creole claims which were known as early as 1872 were relocated for silver-lead ores by Ben L. Croff, shortly before 1900. Known production started in 1907 with the shipment of 200 tons of low grade fluxing iron ore, carrying values in gold, silver and copper. The next known production period was in 1916 when a recorded 5000 tons of ore containing 3.0 percent copper, 11.0 percent zinc and 0.07 ounces gold and 4.5 ounces silver per ton was shipped to the Garfield, Utah plant of the American Smelting and Refining Company. As far as is known, the mine was idle until 1942 when the Nevada-Massachusetts Company mined and shipped 200 tons of ore containing 0.7 percent WO_3 to the Metals Reserve Company. The Operator's interest in the mine ceased in 1943.

The property was inactive from 1943 to 1956 when George and Herman Heinecke acquired it by a lease and option agreement. To December 5, 1958, when Bureau engineers 1/ examined the property, they had constructed a concentrator on the property and had an estimated 1400 tons of broken ore in stopes. Through November 1960, they had mined about 4500 tons of ore. Much of this ore reportedly consisted of material obtained from development headings and from piles of low grade ore left in stopes worked during 1916. Milling operations which started in July 1959, have been continuous except when smelters were shut down for about five months late in 1960. About 3850 tons of ore have been milled which produced 358.5 tons of concentrate assaying

1/ Fillo, P.V., and Young, W.E., Mineral Examination of the Creole mine, Beaver County, Utah, December 5, 1958.

about 6.7 percent copper, 33.4 percent zinc, 0.93 percent bismuth, and 0.16 ounces gold and 8.7 ounces silver a ton. Based on mill recoveries averaging probably about 80 percent, the ore contained about 0.75 percent copper, 3.7 percent zinc, 0.11 percent bismuth, and 0.01 ounce gold and 1.58 ounces silver a ton. Material reportedly containing a high percentage of selectively mined ore assayed about 2.6 percent copper, 8.4 percent zinc, 0.18 percent bismuth, 0.03 gold and 1.5 ounces silver a ton.

During November 1960 the Index-Daley Mines Company started to move in equipment necessary for driving the proposed adit and raise specified in their application for Governmental aid. Preparatory work was completed and excavations at the site of the adit were in progress early in December 1960. Mining and milling operations by the Meinecke Brothers are expected to continue until the Index-Daley Mines Company takes over all operations of the mine upon completion of the adit.

EXTENT AND OWNERSHIP OF THE PROPERTY

The property comprises a group of 35 patented and unpatented lode mine claims (fig. 2).

The Applicant, Index-Daley Mines Company, 114½ North Main Street, Salt Lake City 16, Utah, is part owner of 13 unpatented claims and holds the remaining 22, all patented, by lease agreements.

The Applicant acquired the Creole group of 10 patented claims by an agreement, dated October 13, 1960, with the corporations and individuals listed below. The agreement specifies that the applicant must complete an adit in order to obtain a 50 percent interest in the claims.

> Creole Mining Co., Combined Production Associates, Ltd., G. M. Endraba, Julius Maier, Tilda Redwing and Elizabeth Walker, all of 39 Exchange Place, Salt Lake City, Utah; and Herman W. Heinecke and George F. Heinecke, both of Midvale, Utah.

Herman W. Heinecke and George F. Heinecke, acquired the 10 Creole claims from the South Utah Mines Company and assigned all interests to the above corporations and individuals except a royalty assignment of 5 percent to Lynn Garff, Major Garff and Elmo Garff.

The Index Group of 13 patented claims is owned 50 percent by Herman W. Heinecke and George F. Heinecke and 50 percent by the Applicant.

The seven patented claims of the Lundeval Lease are owned by Gustav B. Lundeval and Charlotte Lundeval of Sweden. George Heinecke

and Herman Heinecke, acquired the claims by a mining lease dated July 10, 1958 and assigned a 50 percent interest in the lease to the Applicant.

The remaining five claims are owned by the Croff Oil Co. George Heinecke and Herman Heinecke acquired the claims by a mining agreement dated October 1, 1960 and assigned a 50 percent interest in the lease to the Applicant.

PRESENT STATUS

During the field investigations, the Index-Daley Mines Company was installing equipment in preparation for driving the proposed adit. The operations were being carried out by the company's field superintendent, George A. Rich, and two miners.

Mine workings are shown on figure 3. Little or no water enters the workings even during periods of heavy rainfall.

The mining and milling operations conducted by the Meinecke Brothers were expected to be resumed within a few days after being idle for about two weeks. According to Mr. Rich, the two brothers generally carry out both operations without assistants. Ore is being mined from a stope bottomed between levels 2 and 3. It is loaded and hauled directly to the surface by a Caterpillar tractor front-end loader. The loader dumps the ore into a 10-ton truck for transportation to a stockpile at the mill. Mining at a rate of about 100 tons daily for three to five days is suspended while the ore is milled and the concentrates are hauled to Milford for railroad transportation to the U. S. Smelting, Refining, and Mining Company, Salt Lake City, Utah.

The Bureau of Mines completed an examination of a flotation concentrate and ore specimen from the Creole mine late in 1960. 2/ Tests, made to determine if bismuth could be recovered as a separate high-grade product, indicated no simple method that might be added

2/ Schack, C. H., written communication, December 16, 1960.

to the present Heinecke mill would yield the desired results.

Improvements on the property consist of a 50-ton ore bin at the mine, and a 100-ton mill and an excavation for a reservoir which are located about one-half mile south of the mine. Advice from the Galligher Company was followed in constructing the mill with used equipment, electrically powered by a 75-KW generator.

Heinecke Brothers major items of mining equipment consist of a small single drum hoist, two 238 CFM compressors, a Caterpillar tractor front-end loader, an Eimco Model 12B loader, a 10-ton GMC dump truck and two Model 390, Thor jack-leg drills. Major equipment installed by the Index-Daley Mines Company comprises a 365 CFM and a 210 CFM compressor, a 61 KW Diesel engine powered electric generator, two 1.5-ton battery locomotives, two mine car loaders, a drilling jumbo, and four drifter percussion drills.

GEOLOGY

General Geology

The Mineral Range is classed with the Basin Range type of mountain. The central portion of the range is underlain mainly by a large mass of granite and sedimentary rocks of upper Carboniferous and lower Triassic age. North and south of the granite mass, the sedimentary rocks are intruded by small bodies of more basic rocks of monzonitic and dioritic composition.

The present variable attitudes of the sedimentary rocks is due in part to the effects of the granitic intrusion and in part to later movements. South of the granitic mass in the area of the Creole claims, the sedimentary rocks regionally strike north to northeast and dip east.

Geology of the Deposit

Geologic formations of the Creole deposit consist of metamorphosed limestone, probably the Elephant limestone of Carboniferous age, and intrusive quartz monzonite (fig. 3). To the east, most formations are in fault contact with thin bedded shales of the Triassic Harrington formation. The contact, which appears to follow a northerly trending canyon, is obscured by a thick mantle of alluvium.

The quartz monzonite crops out south of the mine and its contact with the Elephant limestone, striking about N. 20 W. and dipping 40 degrees to the northeast, is exposed in the adit. The limestone strikes roughly parallel to its contact with the monzonite and dips

about 25 degrees northeasterly. Contact metamorphism of the limestone has resulted in irregular zones of silicate minerals, garnet, tremolite, vesuvianite, etc. Sulfides mainly of copper, zinc and bismuth are closely associated with the more highly altered zones as lenticular and pod-like deposits. Oxides are largely confined to a shallow zone at the surface.

The ore minerals identified in the flotation concentrate and ore specimen tested by the Bureau 3/ were sphalerite and chalcopyrite as major constituents and covellite, galena, pyrite, and bismuthinite as minor constituents. Chemical analyses revealed that the flotation concentrate contained 1.8 percent bismuth, 0.006 percent scandium, and 0.002 percent tellurium. The ore specimen contained 0.3 percent bismuth, 0.002 percent scandium, and less than 0.001 percent tellurium.

The tactite zones exposed at trenches 2 and 3, indicated by the Applicant as veins 2 and 3 on figure 4, occur in undisturbed limestone beds. Each is fully exposed along the strike for a few tens of feet. Thicknesses of the zones of trenches 2 and 3 are about 1-foot and 2-feet, respectively. Mineralization of interest is confined to a zone about 5 feet in diameter at trench 2.

Tungsten, according to Hobbs 4/, occurred as scattered scheelite crystals in irregular bodies of light porous limonite at the surface but a search at depth failed to show more than a few specks of scheelite.

3/ Work cited in footnote 2, p. 8.

4/ Hobbs, S.W., Tungsten Deposits in Beaver County, Utah U.S.G.S. Bull. 945-D, p. 110.

ORE RESERVES

The Applicant states that the zone of mine workings contains 15,000 tons of ore assaying 2.6 percent copper, 4 to 6 percent zinc, 0.25 to 0.30 percent bismuth, and 0.04 to 0.06 ounce gold and 2.8 to 3.7 ounces silver a ton. Based mainly on the 1916 production records and the Applicant's reported assays of mill heads, the estimated grade does not seem unreasonable. However, because none of the numerous, widely scattered, ore showings have been sampled or tested for extent, the reported reserve must be considered as a "horse back" estimate and possibly one of total reserves rather than a known reserve.

Total reserves in the partially developed zone, in the writer's opinion, are in the order of several times a roughly estimated 1000 tons of indicated ore in the showings. A more specific estimate has not been made because the extensions of ore showings cannot be predicated with a reasonable degree of accuracy.

PROPOSED EXPLORATIONS

The Applicant's proposed exploration, as revised, comprises the driving of a 1940-foot adit and a 200-foot raise at an estimated total cost of $90,629.00. (figs. 3 & 4) The adit was designed to test for extensions of the known ore zone and parallel mineralized zones in the hanging wall. The purpose of the raise was to explore the favorable zone at the monzonite-granite contact.

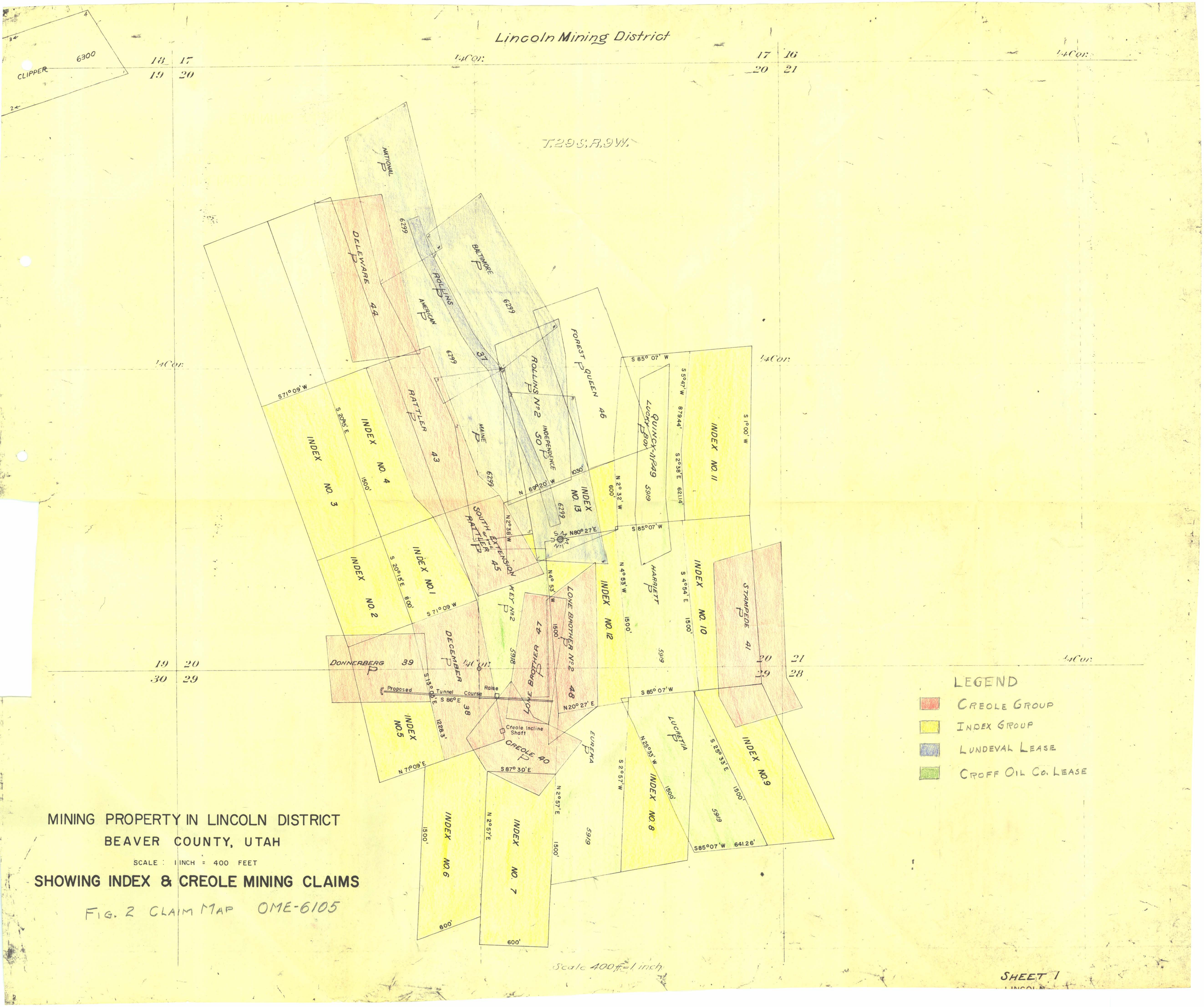
An alternate method of exploring the property, which would be considered for approval, was suggested during the field investigations. Under Stage I of a 3-stage project, level 3 would be extended westerly about 200-feet to test for an extension of the mineralized zone at trench 1. Long-hole drilling would be done at favorable locations along the full length of the level to test both the hanging wall and footwall. Stage II work, if warranted, would include a westerly extension of level 5 for approximately 150-feet and long-hole drilling. Stage III, if justified, would include deepening the incline shaft about 100-feet and a total of about 400-feet of drifting to both east and west from the bottom of the incline shaft. The total cost of the project probably should not exceed $35,000.00.

CONCLUSIONS

At the Creole mine, chances are fair for the discovery of significant amounts of ore. A westerly and a down-dip-extension of the known deposit are the two principal exploration targets. Another target includes a zone between existing workings and the monzonite-limestone contact which appears to have been developed only near the surface. Exploration of these zones from existing workings is feasible and can be done at a reasonable cost. The Applicant's proposed project is not worthy of serious consideration because it would accomplish very little from an exploration standpoint. An estimated 1500-feet of adit would be driven before crosscutting the ore zone at only about 20-feet below the bottom level of the present mine. The adit would be extended an additional 440-feet to test for extensions of veins 2 and 3. The so-called "veins" are very small zones of mineralized tactite in undisturbed limestone beds. Significant extensions of the zones in depth are not expectable since they probably are remnants of beds which extended to the monzonite before being truncated by erosion. Also, there is little justification for a raise properly designed to test the zone at the monzonite-limestone contact because it would explore only a very limited portion of the deposit.

RECOMMENDATION

Denial of the Applicant's request for aid in exploration of the Creole deposit is recommended because, (1) only a very minor portion of the proposed work is concerned with exploration, and (2) the Applicant, being committed to complete the major part of the proposed work, is not interested in a realistic exploratory program for financial reasons.



MINING PROPERTY IN LINCOLN DISTRICT

BEAVER COUNTY, UTAH

SCALE : 1 INCH = 400 FEET

SHOWING INDEX & CREOLE MINING CLAIMS

FIG. 2 CLAIM MAP OME-6105

CME Sample No.	Length 1/ (feet)	Oz/T Au	Oz/T Ag	Percent Cu	Percent Zn	Percent Bi
1	2.5	0.005	0.3	1.35	0.45	0.02
2	3.0	0.01	0.7	1.52	0.40	0.02
3	2.0	Tr.	0.3	0.05	<0.05	<0.01
4	3.0	Tr.	0.5	0.38	0.85	0.01
5	1/	0.02	2.4	1.60	3.65	0.35
6	5.0	0.01	0.8	0.19	0.50	<0.01

Sample No. 5 is grab sample from estimated 25-ton muck pile. Other samples cut normal to bedding.

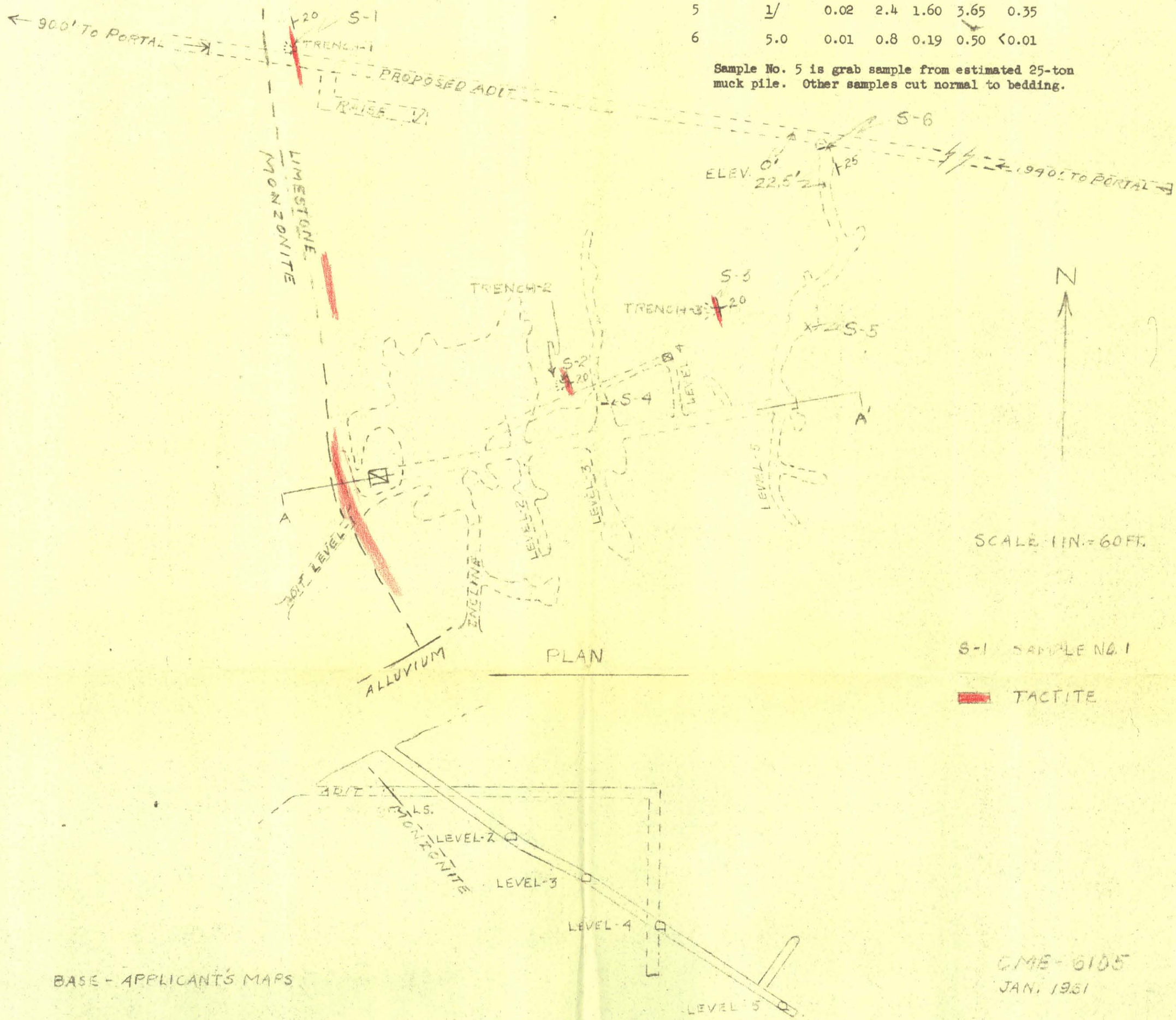
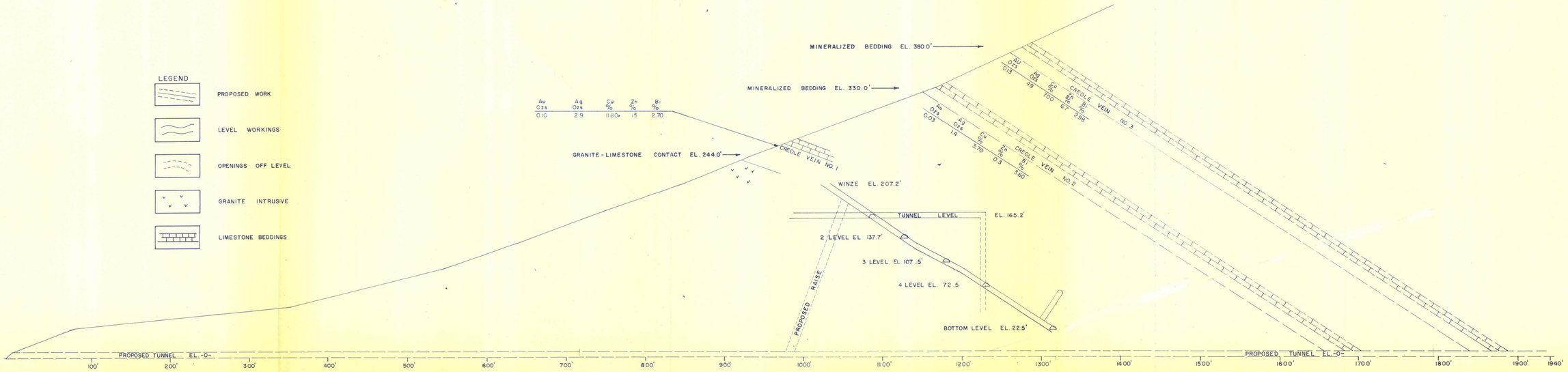


FIG. 3 INDEX-DALEY MINES CO., CREOLE MINE, BEAVER COUNTY, UTAH



NORTH PROFILE OF PROPOSED TUNNEL AND CREOLE INCLINE SHAFT

SCALE 1 IN. = 60 FT.

FIG. 4 OME-6105

PROPOSED DEVELOPMENT OF THE CREOLE MINE

LOCATED 15 MILES EAST OF MILFORD, UTAH

IN

LINCOLN MINING DISTRICT, BEAVER COUNTY, UTAH

BY INDEX-DALEY MINES CO.

PREPARED BY: GEORGE A. RICH.