July 19, 1954

MEMORANDUM

To: Administrator, DMEA

From: Iron and Ferro-Alloys Division, DMEA

Subject: Denial of application by Field Team, Region IV
Docket No. DMEA ~~[illegible]~~ - Tungsten 3374
Mr. Thomas M. Linder and George A. Menger
Cross Mine
Boulder County, Colorado

The denial of the subject application by the Field Team, Region IV, is based on the following information:

The applicants requested $29,909.05 to explore the Cross mine by sinking the shaft an additional 100 feet from the 4th to the 5th level and drifting on the 5th level for 400 feet.

The Cross mine is located in one of the more productive areas of the Boulder tungsten district.

Ferberite ore occurs along a series of northeast-trending steeply dipping fissures in pre-Cambrian Boulder Creek granite and associated pegmatite and aplite dikes.

The Cross mine has an excellent production record, estimated to be 40,000 units of WO_3. This production came mostly from along and above the third level from several intersecting, steeply dipping veins that strike northeasterly.

Workings west of the shaft on the 4th level have developed the Cross No. 3 and Pump veins but no ore is exposed on the level in either structure.

Workings east of the shaft on the 4th level have developed the Cross vein for a distance of 325 feet. The vein is in granite and is as much as 10 inches wide and consists of silicified wall rock, clay gouge and minor amounts of horn quartz and ferberite.

The Cross vein on the 4th level contains no ore although the country rock and the vein structure are favorable for its deposition.

The Field Team concludes that there is no reason to assume that conditions on the fifth level are more favorable for ore deposition than on the fourth level and it appears that in the area southwest of the shaft the bottom of the known zone of ore deposition has been reached.

For the reasons outlined above the Field Team, Region IV, recommended that the application be denied.

We concur in the denial.

F. A. Rutledge, Acting Chief
Iron and Ferro-Alloys Division

JHOPKINS:foc
7-19-54
cc to: Docket
Code 400
Adm. Pending File
Operating Comm.

ocket
Surname

Hopkins
Rutledge

July 19, 1954

MEMORANDUM

To: Administrator, DMEA

From: Iron and Ferro-Alloys Division, DMEA

Subject: Denial of application by Field Team, Region IV
Docket No. DMEA ~~3140~~ 3374 - Tungsten
Mr. Thomas M. Linder and George A. Menger
Cross Mine
Boulder County, Colorado

The denial of the subject application by the Field Team, Region IV, is based on the following information:

The applicants requested $29,909.05 to explore the Cross mine by sinking the shaft an additional 100 feet from the 4th to the 5th level and drifting on the 5th level for 400 feet.

The Cross mine is located in one of the more productive areas of the Boulder tungsten district.

Ferberite ore occurs along a series of northeast-trending steeply dipping fissures in pre-Cambrian Boulder Creek granite and associated pegmatite and aplite dikes.

The Cross mine has an excellent production record, estimated to be 40,000 units of WO_3. This production came mostly from along and above the third level from several intersecting, steeply dipping veins that strike northeasterly.

Workings west of the shaft on the 4th level have developed the Cross No. 3 and Pump veins but no ore is exposed on the level in either structure.

Workings east of the shaft on the 4th level have developed the Cross vein for a distance of 325 feet. The vein is in granite and is as much as 10 inches wide and consists of silicified wall rock, clay gouge and minor amounts of horn quartz and ferberite.

The Cross vein on the 4th level contains no ore although the country rock and the vein structure are favorable for its deposition.

The Field Team concludes that there is no reason to assume that conditions on the fifth level are more favorable for ore deposition than on the fourth level and it appears that in the area southwest of the shaft the bottom of the known zone of ore deposition has been reached.

For the reasons outlined above the Field Team, Region IV, recommended that the application be denied.

We concur in the denial.

SIGNED

F. A. Rutledge, Acting Chief
Iron and Ferro-Alloys Division

JHOPKINS:foc
7-19-54
cc to: Docket
Code 400
Adm. Reading File
Operating Comm.

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

Com

July 19, 1954

MEMORANDUM

To: Administrator, DMEA

From: Iron and Ferro-Alloys Division, DMEA

Subject: Denial of application by Field Team, Region IV
Docket No. DMEA ~~3140~~ 3374 - Tungsten
Mr. Thomas M. Linder and George A. Menger
Cross Mine
Boulder County, Colorado

The denial of the subject application by the Field Team, Region IV, is based on the following information:

The applicants requested $29,909.05 to explore the Cross mine by sinking the shaft an additional 100 feet from the 4th to the 5th level and drifting on the 5th level for 400 feet.

The Cross mine is located in one of the more productive areas of the Boulder tungsten district.

Ferberite ore occurs along a series of northeast-trending steeply dipping fissures in pre-Cambrian Boulder Creek granite and associated pegmatite and aplite dikes.

The Cross mine has an excellent production record, estimated to be 40,000 units of WO_3. This production came mostly from along and above the third level from several intersecting, steeply dipping veins that strike northeasterly.

Workings west of the shaft on the 4th level have developed the Cross No. 3 and Pump veins but no ore is exposed on the level in either structure.

Workings east of the shaft on the 4th level have developed the Cross vein for a distance of 325 feet. The vein is in granite and is as much as 10 inches wide and consists of silicified wall rock, clay gouge and minor amounts of horn quartz and ferberite.

The Cross vein on the 4th level contains no ore although the country rock and the vein structure are favorable for its deposition.

The Field Team concludes that there is no reason to assume that conditions on the fifth level are more favorable for ore deposition than on the fourth level and it appears that in the area southwest of the shaft the bottom of the known zone of ore deposition has been reached.

For the reasons outlined above the Field Team, Region IV, recommended that the application be denied.

We concur in the denial.

F. A. Rutledge

F. A. Rutledge, Acting Chief
Iron and Ferro-Alloys Division

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

224 New Customhouse
Denver 2, Colorado

June 30, 1954.

Mr. Thomas M. Linder
Mr. George A. Menger
Box 416
Nederland, Colorado

Re: Docket No. DMEA-3374

Gentlemen:

Reference is made to your application for Government aid on the Cross mine.

Projects approved by the Defense Minerals Exploration Administration must, in its judgment, show definite promise of yielding material of acceptable grade, and in quantities that will significantly improve the mineral supply position for the National Defense Program.

A careful study of your property and data available to this agency reveals that the probability of disclosing mineable reserves of Tungsten is not considered sufficiently promising to justify Government participation. Under these circumstances, we regret to advise that your application for exploration aid is denied.

Very truly yours,

W H King

W. H. King
Field Team, Region IV

RDB:cwm

cc: Docket 3374
Administrator, DMEA
WMTraver
AHKoschmann
Chron.

A. H. Koschmann

A. H. Koschmann
Field Team, Region IV

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

224 New Customhouse
Denver 2, Colorado

June 30, 1954.

Memorandum

To: Administrator, Defense Minerals Exploration Administration
Attention: 200

From: Field Team, Region IV

Subject: Report of Examination - Docket No. DMEA-3374 (Tungsten), Thomas M. Linder and George A. Menger (Cross mine), Boulder County, Colorado.

Enclosed are four copies of the Report of Examination on the subject property, a copy of the letter of denial to the applicant, and two copies of Form 3b.

W. H. King

W. H. King

A. H. Koschmann

A. H. Koschmann

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Mining Division
Region IV

June 30, 1954.

Memorandum

To: Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: Engineering Report of Examination - DMEA Docket 3374 (Tungsten), Thomas M. Linder and George A. Menger (Cross mine), Boulder County, Colorado.

Enclosed are the original and eight copies of the Engineering Report of Examination on the subject docket.

The original application requested $29,909.05 to explore the Cross mine by sinking the shaft an additional 100 feet from the 4th to the 5th level and drifting on the 5th level for 400 feet.

The examining team does not believe that the property has enough merit to justify Government participation in an exploration project and recommends denial of the application.

We concur in this recommendation.

W. H. King

W. H. King

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Region IV

Building 20, Room 137
Denver Federal Center
Denver 14, Colorado
June 23, 1954

Memorandum

To: Executive Officer, DMEA Field Team, Region IV

From: Chief, Mineral Resources Branch, Mining Division, Region IV

Subject: DMEA 3374 (Tungsten), Thomas M. Linder and George A. Menger (Cross Mine) Boulder County, Colo.

Transmitted herewith are the original and eight copies of an engineering report by R. L. Bolmer on the subject docket.

Bolmer concludes that the Cross mine ore shoots have shown a tendency to decrease in extent and become more impoverished with depth, have been explored and developed beyond their productive limits, and are probably bottomed at or above the 3rd level. Discoveries beyond the limits, while possible, would not justify the cost of the exploration proposed with Government participation. He recommends denial of the loan application.

I concur with his conclusions and recommendations.

The brochure forwarded with your memorandum of May 21, 1954, instructing us to prepare a report, is returned herewith.

T. N. Ewart, for
W. M. Traver

enclosure

WMT/kp

cc 8
DMEA 3374
Chron

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Defense Minerals Exploration Administration
Denver Federal Center
Denver 2, Colorado

June 18, 1954

To: DMEA Field Team, Region IV

From: A. H. Koschmann

Subject: DMEA Docket 3374, Cross Mine, Boulder County, Colorado

Enclosed are 9 copies of a geologic report by E. N. Harshman of the U. S. Geological Survey covering the above docket.

Although the Cross mine has been a significant producer of tungsten ore, Harshman concludes that the bottom of the known ore horizon has been approached and that exploration on a lower level will not discover significant tungsten ore. He therefore recommends denial of the application for exploration assistance. I concur in this recommendation.

Joint Summary, Conclusions, and Recommendations are also enclosed.

E. N. Harshman
for A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (18)

CROSS MINE
BOULDER COUNTY, COLORADO

DMEA DOCKET 3374

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

By E. N. Harshman, U. S. Geological Survey
and
R. L. Bolmer, U. S. Bureau of Mines

CROSS MINE
BOULDER COUNTY, COLORADO

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Thomas M. Linder and George A. Menger have applied for assistance to explore for tungsten ore in the Cross mine, 2 miles northeast of Nederland, Boulder County, Colorado. The proposed exploration consists of 100 feet of shaft sinking, from the fourth to the fifth levels, and 400 feet of drifting on the Cross vein. The applicants estimate the total cost of the project to be $24,909.05.

The Cross Mine is located in one of the more productive areas of the Boulder tungsten district. Ferberite ore occurs along a series of steeply dipping northeast-trending fissures in pre-Cambrian Boulder Creek granite and related intrusive dikes.

The Cross mine has an excellent production from several intersecting veins. It has been developed to a depth of 359 feet on 3main levels and a short sub-level has recently been driven 43 feet below the fourth or bottom level.

Most of the ore produced in the Cross mine has been extracted from stopes on or above the third level and it appears that the bottom of the known ore horizon has been reached or approached by work on the fourth sub-level.

The program of exploration proposed by the applicants is far more extensive than warranted by the ore potential of the ground to be explored.

It is concluded that exploration below the fourth level of the Cross mine will not lead to the discovery of significant amounts of tungsten ore and denial of the application for exploration assistance is recommended.

CROSS MINE

BOULDER COUNTY, COLORADO

DMEA DOCKET 3374

Geologic Report

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

CROSS MINE
BOULDER COUNTY, COLORADO

INTRODUCTION

Thomas M. Linder and George A. Menger, both of Nederland, Colorado, have applied to the Defense Minerals Exploration Administration for assistance to explore for tungsten ore in the Cross mine, 2 miles northeast of Nederland, Boulder County, Colorado. The applicants lease, from Hetzer Mines Inc., the property described as follows: a tract of ground 150 feet wide and 1300 feet long, being 75 feet on each side of what is known as the Cross No. 1 vein, and extending 300 feet west along said vein from the Cross No. 1 shaft, and 1,000 feet east along said vein from said Cross No. 1 shaft.

The applicants propose to explore by sinking the Cross No. 1 shaft from the fourth to the fifth level (100 feet) and by drifting on the Cross No. 1 vein 150 feet southwest and 250 feet northeast from the bottom of the shaft. The estimated cost of this program is $24,909.05.

The property was examined on June 2, 1954, in company with R. L. Bolmer, U. S. Bureau of Mines, and George A. Menger, one of the applicants. It is concluded that although small shoots of tungsten ore may be discovered by exploration on the Cross No. 1 vein below the fourth level, discovery of significant deposits is improbable. Denial of the application for exploration assistance therefore is recommended.

GEOLOGY

The Cross mine is located in one of the more productive areas of the Boulder tungsten district. Ferberite ore occurs along a series of

northeast-trending steeply dipping fissures in pre-Cambrian Boulder Creek granite and associated pegmatite and aplite dikes. The principal minerals of the veins are ferberite and horn quartz although pyrite, barite, magnetite, scheelite, and several clay minerals are present in some of the ore. The ore shoots appear to have resulted primarily from filling of open spaces rather than by replacement of the wall rocks. Thus the location and size of ore shoots is customarily controlled by competence of the wall rocks and changes in the dip and strike of the mineralized fissures.

The Cross mine has an excellent production record, estimated to be 40,000 units of WO_3 for the period 1907 through 1953. The ore was mined from several intersecting, steeply dipping veins that strike northeasterly. From data on available maps and an examination of the fourth level workings, it is concluded that most of the ore was extracted from ground along and above the third level.

Figure 2, taken from maps prepared by Ogden Tweto, shows the fourth level geology of the Cross mine. Workings west of the shaft have developed the Cross No. 3 and Pump veins but no ore is exposed on the level in either structure. Both veins occupy a well defined fracture or fracture zone, 6 inches to 2 feet wide, containing considerable clay gouge, some horn quartz, and little or no ferberite. The Cross No. 3 vein continues strong to the west face of the drift along this structure, but the Pump vein breaks up into several minor splits and loses its identity before the west face of the Pump vein drift is reached.

East of the shaft on the fourth level a drift has developed the Cross vein for a distance of 325 feet. The vein occupies a fracture in somewhat altered granite intruded by pegmatite and hornblende monzonite prophyry. The vein is as much as 10 inches wide and consists of silicified

wall rock, clay gouge, and minor amounts of horn quartz and ferberite.

Three diamond drill holes are shown on figure 2. They were drilled from a station 245 feet east of the shaft and explored the Cross vein below the fourth level. Ore was cut in Diamond Hole No. 2a between a depth of 24.6 and 25.5 feet. The results of the drilling are shown in the table on figure 2.

The applicants sank a winze on the Cross vein at a point 225 feet east of the shaft in an attempt to develop the ore cut in Drill Hole No. 2a. The winze is 45 feet deep and at a point 43 feet below the fourth level, a drift (the fourth sub-level) was driven 45 feet northeasterly along the vein (figure 2). The drift follows a shear zone in granite ranging in width from a few inches to about 4 feet. Several silicified stringers are present in the shear zone and although now mined out a trace of horn quartz and ferberite is reported to have been exposed along this drift between a point 14 and 19 feet northeast of the winze. A small, irregular stope, 5 to 15 feet long and extending from the fourth sub-level to within 7 or 8 feet of the fourth level has been mined. The ore shoot appears to have been from 1 to 10 inches wide. The applicant reports the mill returns on this ore to be about $3,000.

PROPOSED EXPLORATION PROGRAM

The applicant proposes to explore the Cross vein by deepening the shaft 100 feet and driving a fifth level drift, from the bottom of the shaft, a distance of 150 feet southwesterly and 250 feet northeasterly along the vein(figure 2). There is little reason to believe that drifting southwesterly on the fifth level will find ore. The Cross vein on the fourth level contains no ore although the country rock and the vein structure are favorable for its deposition. There is no reason to assume

that conditions on the fifth level are more favorable for ore deposition than on the fourth level and it appears that in the area southwest of the shaft the bottom of the known zone of ore deposition has been reached.

Northeast of the shaft small ore shoots may be discovered by deeper exploration although here too it appears that the bottom of the known zone of ore deposition has been reached or approached by development and mining on the fourth sub-level.

CONCLUSIONS AND RECOMMENDATIONS

The program of exploration proposed by the applicants is far more extensive than is warranted by the very limited ore potential of the block of ground along the Cross vein below the fourth level. Exploration pursued by the applicant indicates that small irregular ore shoots may lie below the fourth level in the area northeast of the shaft but production of ore from these shoots will be insignificant.

For the reasons outlined above, it is recommended that the application for exploration assistance, DMEA Docket 3374, be denied.

DMEA 3374

CROSS MINE
THOMAS M. LINDER AND GEORGE A. MENGER
BOULDER COUNTY, COLO.

Engineering Report

By R. L. Bolmer
Mining Engineer
Bureau of Mines

DMEA 3374

CROSS MINE
THOMAS M. LINDER AND GEORGE A. MENGER
BOULDER COUNTY, COLO.

CONTENTS

Engineering Report — Page

Introduction..... 1
Location..... 2
Ownership and extent..... 2
History and production..... 3
Description of the deposit..... 4
Present status..... 5
Project proposals..... 6
Conclusions..... 6
Recommendations..... 7

ILLUSTRATIONS

Figure — Follows page

1. Location map, Cross mine, Boulder County, Colo..... 2
2. Geological map of 4th level, Cross mine, Boulder County, Colo..... *

*See figure with geologic report.

DMEA 3374

CROSS MINE
THOMAS M. LINDER AND GEORGE A. MENGER
BOULDER COUNTY, COLO.

ENGINEERING REPORT

By R. L. Bolmer

INTRODUCTION

Thomas M. Linder and George A. Menger, P. O. Box 416, Nederland, Colo., made application for aid in an exploration project pursuant to DMEA Order-1, under the Defense Production Act of 1950, as amended (Docket No. DMEA 3374). The applicants, lessees of the Cross mine in Boulder County, Colo., proposed to explore that property for tungsten. Specifically, the applicants proposed deepening the Cross No. 1 shaft by 100 feet and drifting a total of 400 feet along the Cross vein on a newly established 5th level of the mine. They estimated the total cost of the proposed work as $29,909.05.

A field examination and report on the property were requested by the Defense Minerals Exploration Administration Field Team, Region IV. The Cross mine was examined June 2, 1954, with E. N. Harshman of the Geological Survey and G. A. Menger, one of the applicants. This report is based on the field examination of the property and is submitted, with the examining engineer's conclusions and recommendations, for the purpose of aiding the Field Team in evaluating the applicants' proposal.

LOCATION

The Cross mine is located in the NW1/4 sec. 8, T. 1 S., R. 72 W., sixth principal meridian, Boulder County, Colo. (fig. 1). It is about 3-1/2 miles northeast of Nederland, Colo., via state and county roads which are maintained and accessible all year. The elevation of the property is about 8,250 feet. The mine is connected to the electrical transmission lines of the Public Service Company of Colorado. The nearest custom mill for tungsten ore is located at Nederland. Boulder, Colo., the nearest supply and labor center and a shipping point on the Union Pacific railroad, is 19 miles east of the property. Rollinsville, Colo., a shipping point on the Denver and Rio Grande railroad, is 5 miles south of Nederland via State Highway 119.

OWNERSHIP AND EXTENT

The property under lease by the applicants is owned by Hetzer Mines, Inc. of 250 Pearl St., Boulder, Colo. The applicants' lease with Hetzer Mines, dated January 15, 1954, and for a term of 3 years, describes the property as a tract of ground 150 feet wide and 1,300 feet long, being 75 feet on each side of what is known as the Cross No. 1 vein and extending 300 feet west along said vein from the Cross No. 1 shaft, and 1,000 feet east along said vein from the Cross No. 1 shaft.

The lease calls for a royalty of 16 percent of the net proceeds from the sale of any ores produced from the property. Hetzer Mines retains a right to purchase all ores produced from the premises provided its schedule of prices is at least equal to the price offered by any other party.

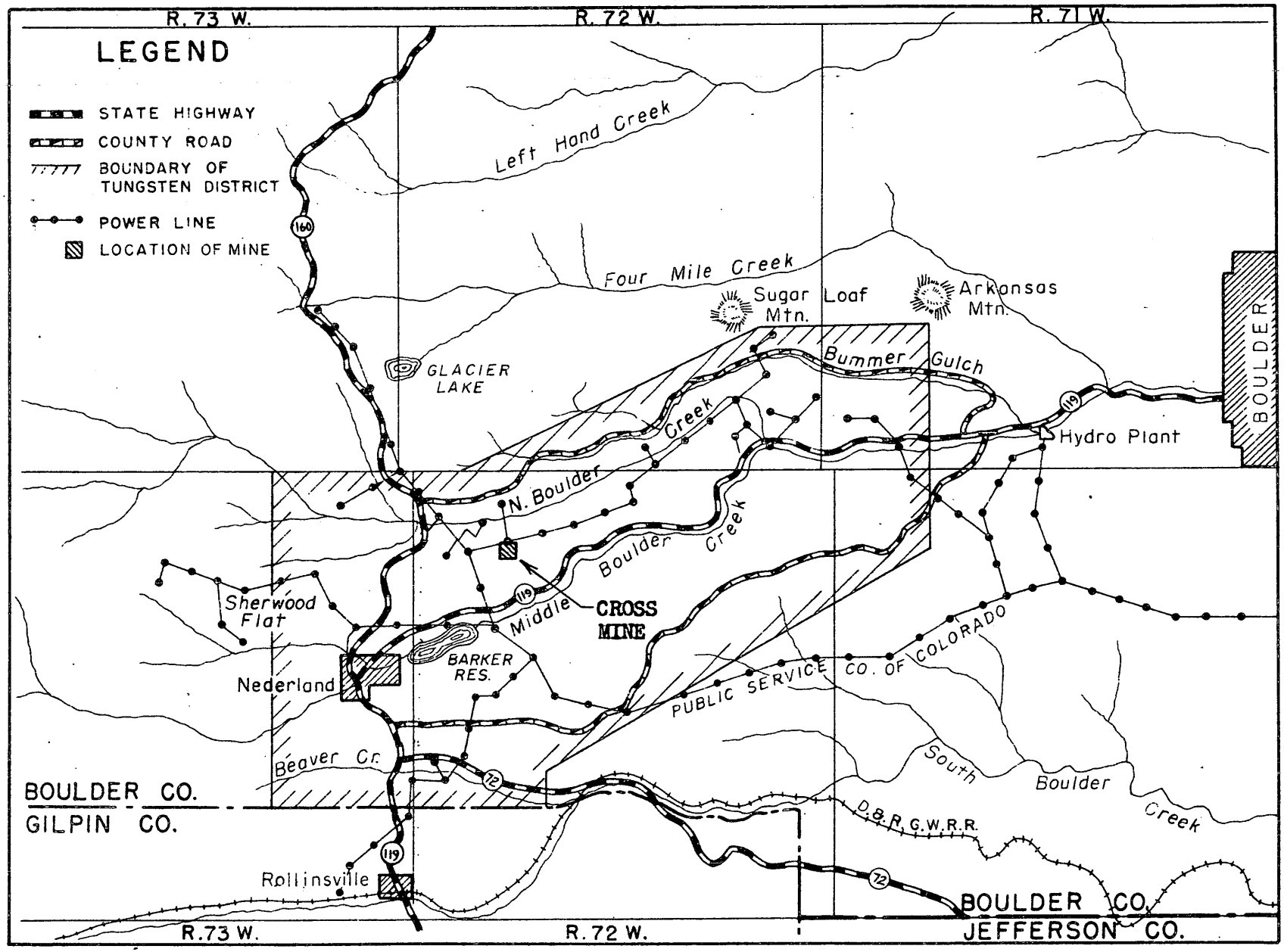


FIGURE 1-LOCATION MAP, CROSS MINE, BOULDER COUNTY, COLO. (DMEA 3374)

HISTORY AND PRODUCTION

The property is part of the old Trevarton ranch, an agricultural patent owned for many years by the Wolf Tongue Mining Co. This company, a subsidiary of the Firth Stirling Steel and Carbide Corp., sold all its Boulder County properties to Hetzer Mines in 1950. The Cross mine, with a recorded total output since 1907 of more than 40,000 short-ton units of tungsten trioxide, is one of the more productive properties in the Boulder County tungsten district. The Cold Spring mine, the second largest total producer in the district, is located just southeast of the Cross property.

The Cross veins were productive from the surface down to the 3rd level of the No. 1 shaft. The main ore shoots bottomed at about the 3rd level and lower development of the veins generally was unproductive. Diamond drilling by the Bureau of Mines during World War II indicated ore at one locality below the 4th level of the mine. In 1954, the present lessees sank a 45-foot winze to develop this showing. The lens of ore encountered by this work was very limited in extent and had been extracted by the date of inspection.

The recorded past production of the property is summarized below. Most of the recent production shown was derived from old stope fill and the old Cross dumps.

Year	Weight (pounds)	Average grade (percent WO_3)	WO_3 content (pounds)
1907-50	6,661,233	11.63	774,551.70
1951	26,712	17.49	4,671.81
1952	315,923	7.07	22,331.83
1953	160,026	5.85	9,378.79
1954 (4 months)	80,120	2.33	1,863.01
Total	7,244,014	11.22	812,797.14

DESCRIPTION OF THE DEPOSIT

A branching system of narrow fissure veins has been developed to a depth of 400 feet and for an overall length of about 800 feet in the Cross mine. The northeasterly striking fissures dip steeply in granite. Most of the fissure filling consists of fine-grained quartz. Along certain sections of the veins, the ore mineral, ferberite (ferrous tungstate), occurs either as thin seams of nearly pure mineral in the quartz or as the matrix of a breccia of country rock and early vein quartz. The mineral varies from a nearly pure, finely crystalline form of massive ferberite to a low-grade, non-crystalline variety intimately associated with silica (horn ore).

The Cross system of fissures was developed from the surface by the 400-foot, inclined Cross No. 1 shaft. The 2nd, 3rd, and 4th level drifts were turned northeasterly and southwesterly on the vein at depths of 160, 260, and 375 feet. The 1st level has been obliterated by stoping.

Northeast of the shaft, the fissure system is represented by the main Cross vein. Most of the upper levels are inaccessible but the old maps indicate that fairly continuous ore shoots were mined above the 2nd level for a distance of 350 feet northeast of the shaft. These ore bodies probably extended farther northeasterly along the 1st level and at the surface. Although the Cross vein was developed for considerable distances northeasterly on the 3rd level, ore was not encountered beyond 50 feet from the shaft. The vein was weak and essentially barren of ferberite throughout its northeasterly development on the 4th level (fig. 2). A minor occurrence of mineral was encountered along the

4th level drift about 225 feet northeast of the shaft. At this location, the applicants sank a 45-foot winze on the vein and drove a sublevel 45 feet northeasterly under and beyond the ore shoot. Subsequent mining disclosed the lens of ore to be 15 to 20 feet in length and to extend about 35 feet below the 4th level.

Southwest of the shaft, the main Cross fissure splits into four principal branch fissures referred to as the Cross No. 1, Cross No. 2, Cross No. 3, and Pump veins. Most of these branch fissures contained fairly continuous mineral and were stoped for considerable distances along the upper levels of the mine. The ore shoots on the various branch fissures extended about 450 feet southwest of the shaft on the 2nd level and about 350 feet southwest on the 3rd level. The ore on this side of the shaft also bottomed at or near the 3rd level. The various branch fissures, where exposed by the development southwesterly on the 4th level, were narrow, tight, and barren of ferberite.

PRESENT STATUS

The mine has been operated intermittently during 1954. It is fully equipped for a small tonnage operation. Its equipment, for the most part, is old but adequate and serviceable. A frame building at the collar of the No. 1 shaft houses an electric-powered hoist and air compressor. It also serves as a work shop and warehouse. The two-compartment No. 1 shaft is well timbered and in serviceable condition. One compartment is provided with skids for hoisting by means of a bucket; the second compartment serves as a manway. The shaft is equipped with a serviceable, four-post, wooden headframe. A trommel for screening hoisted ore is located adjacent to the shaft collar.

The applicants have been pulling stope fill from along the 3rd level and mining from the winze below the 4th level; most of the old development on these levels is accessible. The mine makes a small amount of water, which is pumped to the surface from a sump below the 4th level.

PROJECT PROPOSALS

The applicants propose to deepen the No. 1 shaft by 100 feet and to drift 250 feet northeasterly and 150 feet southwesterly from the shaft on a new 5th level (fig. 2). The northeast drift probably would be on the main Cross vein. The main structure splits in the vicinity of the shaft and it is unknown which of the branches the applicants propose exploring in the southwesterly direction. The applicants have detailed their estimated costs in their application. A total cost of $10,082.55, or $100.83 per foot, has been estimated for the proposed sinking. A total cost of $14,826.50, or $37.07 per foot, is estimated for the proposed drifting. The cost estimates by the applicants, while not too far out of line, are somewhat higher than have been experienced for similar work elsewhere in the district.

CONCLUSIONS

The productive ore shoots on the Cross system of fissure veins were longest near the surface. They shortened somewhat with increasing depth and bottomed at or near the 3rd level of the Cross No. 1 shaft. The veins have been developed for considerable distances, both laterally and with depth, beyond the limits of these productive bodies. Such development has indicated that the fissures outside the productive areas are weak and unmineralized.

One isolated and very limited lens of ore has been found beyond and below the limits of the main ore shoots. It is possible that deeper exploration, such as the applicants propose, would result in the discovery of one or more similar occurrences. Such a discovery would not be significant and could not justify the cost of the proposed exploration. Exploration, as is proposed, easily could miss such small targets.

The fact that the ore bottomed near the 3rd level and that lower development disclosed a weakened, unmineralized structure indicates the improbability of making a significant discovery through exploration with greater depth.

RECOMMENDATIONS

It is recommended that the applicants' request for assistance to explore the Cross vein with greater depth be denied.

fkp

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

224 New Customhouse
Denver 2, Colorado

May 21, 1954.

Memorandum

To: Administrator, Defense Minerals Exploration Administration
Attention: Code 200

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docketing for Exploration Assistance

Enclosed herewith in duplicate is DMEA Form 3A and MF-103 and supporting data pertaining to the following application for Government assistance in exploration work:

Linder & Menger d.b.a. Cross Mine (Tungsten)
Box 416
Nederland, Colorado

W. H. King

Enclosures

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

224 New Customhouse
Denver 2, Colorado

May 21, 1954.

Memorandum

To: Administrator, Defense Minerals Exploration Administration
Attention: Code 200

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docketing for Exploration Assistance

Enclosed herewith in duplicate is DMEA Form 3A and MF-103 and supporting data pertaining to the following application for Government assistance in exploration work:

Linder & Menger d.b.a. Cross Mine (Tungsten)
Box 416
Nederland, Colorado

W. H. King

W. H. King

Enclosures

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Form Approved.
Budget Bureau No. 42-R1035.2.

Defense Minerals Administration
RECEIVED

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

1954 *Not to be filled in by applicant*

Docket No. 3374
Metal or Mineral Tungsten
Date Received
Estimated Cost $24,909
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: [illegible] (Partnership) Nederland, Colorado
[illegible] Linder, Box 116 Nederland, Colorado
[illegible] Linder, Box 116 Nederland, Colorado

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers.

(*d*) If a partnership, add to the above statement the names and addresses of all partners.

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract
(See Attached)

(*b*) State any mine name by which the property is known. Green King

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise
lessee

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property. (See attached lease)

(*e*) If you own the land, describe any liens or encumbrances on it
(none known)

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice.

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes. [illegible]

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades.

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you. [illegible]

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points. (See attached)

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.
All in [illegible] Nederland [illegible].

16—66551-1

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore TUNGSTEN

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings, and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc. (see attached)

(*c*) The work will start within five days and be completed within 15 months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations. (see attached)

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project (see attached)

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.).

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants. (see attached)

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel. (see attached)

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be. (see attached)

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project. (see attached)

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project. none

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes. (see attached)

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above.

NOTE.—No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs. (see attached)

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)? We are prepared to furnish our share of the cost.

(*b*) How do you propose to furnish your share of the costs?

☐ Money ☐ Use of equipment owned by you ☐ Other

Explain in detail on acompanying paper.

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

Dated May 20, 1954

Linder and Menger
(Applicant)

By Tom Linder

George R Menger

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—66551-1

[illegible] Miller & Morgan
[illegible] Box 4[illegible]
Annora [illegible] Idaho Springs, Colorado

3. Applicant's property rights:
(a) That part of the Northeast Quarter of Section Eight, Township One South, Range 72 West, Boulder County, Colorado, described as follows: A tract of ground 300 feet wide and 1000 feet long, being 75 feet on each side of that is known as Green No. 1 Vein, and extending 300 feet West along said vein from Green No. 1 Shaft, and 1000 feet East along said vein from said Green No. 1 Shaft

4. Physical description:
(a) See attached map. Leasehold interest. All-weather dirt road leading up to the location and such is easily accessible in all weather.
(b) State past and current production

Green No. 1 Mine

Weight Lbs.	Sn,	Wg, Contained
1907		
thru		
1940		
1940	22[illegible]	11.62	770[illegible].40
1940	1[illegible]	4.[illegible]	0[illegible].00
1940	2[illegible]	57.50	0[illegible].00
1940	[illegible]	7.[illegible]	0[illegible].00
1940	[illegible]	0.[illegible]	0[illegible].00
1940	[illegible]	0.00	0[illegible].00
(To Day Inc)			
Total	7[illegible]	11.22	[illegible]

(c) Tungsten ore found in vein--Belief of rich deposits in good commercial quantity.
(d) Location is 3 miles off the Rock-to-Tank highway, on all-weather dirt road. Access road from highway is all-weather dirt road open the year around. Location is 2 miles to railpoint. Location is 20 miles from supply point. Location is 55 miles from Denver.

5. The exploration project:
(a) See attached map. The proposed work is to sink a main shaft 200 ft. on the vein.
(b) The applicants feel that they have the ability and experience to carry out the proposed work by virtue of two years mining experience in hard rock mining. Also, the supervisor has had 25 years experience in hard rock mining with approximately 12 years as supervisor in a hard rock mine.

6. Estimate of Costs:
(a) Independent Contractor. None
(b) Labor, supervision, consultation:

One miner and supervision	2.00 per hr.	
One miner 1st shift	1.50 per hr.	
One hoist man	1.50 per hr.	
One Engineer hoist man	1.50 per hr.	) 5,200.00
Engineering & Geological Consultants		500.00
	Total	) 5,[illegible].00

Linder & Konger
Box 415
Kelerinni, Colorado

Cont'd. Annorn

6. Estimate of Costs:

(c) Operating materials and supplies:

Timber and cribing and nails	66.00 ft.	$ 600.00
100 ft. 4in. pipe	1.10 ft.	110.00
100 ft. 2in. pipe	.40 ft.	40.00
2 - 2in valves	5.50	11.00
10 - 4in. elbows	4.00	40.00
10 - 2in. elbows	.80	8.00
100 ft Electric cable	1.25	125.00
50 ft air hose		30.00
50 ft water hose		34.00
powder caps fuse		500.00
electricity 7 months	170.00 per mo.	1,190.00
10 carbon drill bits	11.00	11.00
6 steels		30.00
	Total	$ 2,931.40

(d) Operating equipment: for 7 months

1 type 10 Ingersol compressor	$ 30.00 per mo.	$ 210.00
1 hoist and motor	15.00 per mo.	105.00
1 jack hammer and leg	7.50 per mo.	52.50
1 muck car	5.00 per mo.	35.00
1 truck for waste rock	20.00 per mo.	140.00
		$ 542.50

(e) Rehabilitation and repairs: None

(f) New buildings, improvements, installations: None

(g) Miscellaneous:

Repairs on air compressor	$ 125.00
repairs on truck	50.00
repairs on hoist and motor	25.00
repairs on jack hammer	25.00
repairs on all miscellaneous equipment	65.00
Bookkeeper wages 15 hrs. at $ 30.00 per mo.	210.00
workmen's compensation employers' insurance	173.25
payroll taxes	110.40
	$ 788.65

(h) Contingencies: $400.00

$10,983.55

Linder & Ronger
Box 416
Nederland, Colorado

Answers

3. Applicants property rights:
(a) That part of the Northwest Quarter of Section Eight, Township One South, Range 72 West, Boulder County, Colorado, described as follows: A tract of ground 150 feet wide and 1300 feet long, being 75 feet on each side of what is known as Cross No. I Vein, and extending 300 feet West along said vein from Cross No. I Shaft, and 1000 feet East along said vein from said Cross No. I Shaft

4. Physical description:
(a) See attached map. Leasehold interest. All-weather dirt roads lead up to the location and such is easily accessible in all weather.
(b) State past and current production

Cross No. I Mine

	Weight Lbs.	WO_3	Contained WO_3
1907 thru 1940	6690212	11.63	778320.40
1950	5021	4.56	231.30
1951	26712	17.50	4671.31
1952	325629	7.07	23351.23
1953	161026	5.86	9370.79
1954 (To Day Lot)	60220	2.32	1395.32
Total	7244011	11.22	812727.14

(c) Tungsten ore found in vein-- belief of rich deposits in good commercial quantity.
(d) Location is 3 miles off the Peak-to-Peak highway, on all-weather dirt road. Access road from highway is all-weather dirt road open the year around. Location is 3½ miles to shipping point. Location is 19 miles from supply point. Location is 3½ miles from residence.

5. The exploration project:
(b) See attached maps. The proposed work is to drift 250 ft. NE on the vein and drift 150 ft. Southwest on the vein.
(d) The applicants feel that they have the ability and experience to carry out the proposed work by virtue of two years mining experience in hard rock mining. Also, the supervisor has had 25 years experience in hard rock mining with approximately 12 years as supervisor in a hard rock mine.

Linder & Menger
Box 416
Nederland, Colorado

Answers

6. Estimate of Costs:

(a) Independent Contracts. None

(b) Labor, supervision, consultants:

One miner and supervision	$2.00 per hr.	
Two miners 1st class	1.65 per hr.	
One hoist man	1.50 per hr.	
One Engine Room man	1.50 per hr.	$7,128.80
Engineering & Geological Consultants		400.00
		$ 7,528.00

(c) Operating Materials and Supplies:

Timber and cribing and nails	$5.00 per ft.	$ 2,000.00
400 ft. 1in. pipe	.24 per ft.	96.00
3 - 1 in. valves	2.25	6.75
40 - 1 in. sleeves	.34	13.60
800 ft. rail		150.00
20 lbs. rail bolts	.25	5.00
50 lbs. rail spikes	.17	8.50
40 fish plate	.40 per pair	16.00
50 ft. air hose		30.50
50 ft. water hose		34.00
15 carbon bits	11.00 each	165.00
powder, caps, fuse,	3.50 ft.	1,400.00
Electricity 8 months	170.00 per mo.	1,360.00
		$ 5,290.35

(d) Operating equipment: for 8 months

1 Type 10 Ingersol compressor	$ 30.00 per mo.	$ 240.00
1 hoist and motor	15.00 per mo.	120.00
1 jack hammer and leg	7.50 per mo.	60.00
1 muck car	5.00 per mo.	40.00
1 truck for waste rock	20.00 per mo.	160.00
		$ 620.00

(e) Rehibilation and repairs: None

(f) New buildings, improvements, installations: None

(g) Miscellaneous:

Repairs on air compressor	$ 135.00
repairs on truck	50.00
repairs on hoist and motor	25.00
repairs on jack hammer	25.00
repairs on all miscellaneous equipment	65.00
Bookkeeper wages 8 months at $ 30.00 per mo.	240.00
workmen's compensation employers' insurance	196.75
payroll taxes	150.60
	$ 887.35

(h) Contingencies: $ 600.00

$14,825.50

[illegible] OF [illegible] INTEREST

[illegible] THAT I, [illegible] Castagne, an adult, of the County of [illegible], State of Colorado, for and in consideration of the Dollar ($1.00), the receipt thereof is hereby acknowledged, and for other valuable consideration, I, the undersigned, do hereby sell, convey, and transfer to Ben Blaker and [illegible], a partnership doing business as Blaker & [illegible], of Nederland, County of Boulder, State of Colorado, all interest of any nature whatsoever I do have or own in the following described mining property:

[illegible] of the Northwest Quarter of section [illegible], [illegible] [illegible] from [illegible]-line [illegible], Boulder County, [illegible] described as follows: [illegible] of general life [illegible] and 1000 feet long, [illegible] on each side of line to [illegible] Claim No. 1 [illegible], and extending 300 feet West along said vein from Claim No. 1 [illegible], and [illegible] vein [illegible] and [illegible] Claim No. 2 [illegible], and also,

[illegible] and 300 [illegible] feet [illegible], together with [illegible] appurtenances thereto.

[illegible] to [illegible] from the [illegible], [illegible] by a [illegible] of the 1896 [illegible], providing such [illegible] to the [illegible], [illegible] and [illegible].

In witness whereof, I have hereunto set my hand and seal this 18 day of May, 1954, A.D.

/s/ Morris Castagne (SEAL)

[illegible] }
[illegible] } ss.

[illegible] 18 [illegible]

[illegible]

[illegible]

[illegible]

Seal

/s/ Ruth E. Warden
Notary Public

[illegible]
Box 416
Nederland, Colorado

LINDER & MENGER
Box 416
Nederland, Colorado

LEASE

THIS INDENTURE, Made and entered into this the 15th day of January, 1954, between HETZER MINES, INC., a corporation, hereinafter called the Lessor, and TOM LINDER, GEORGE MENGER, and MORRIS A. CASTAGNE, hereinafter called the Lessees,

WITNESSETH: That the lessor in consideration of the covenants and agreements of the Lessees hereinafter expressed to be kept and performed by the Lessees and subject upon the terms hereinafter provided, has leased and demised, and by these presents does lease and demise unto the Lessees the following described mining property, to-wit:

That part of the Northwest Quarter of Section Eight, Township One South, Range Seventy-two West, Boulder County, Colorado, described as follows: A tract of ground 150 feet wide and 1300 feet long, being 75 feet on each side of what is known as Cross No. 1 Vein, and extending 300 feet West along said vein from Cross No. 1 Shaft, and 1000 feet East along said vein from said Cross No. 1 Shaft, and also,
One 11 horse power hoist, and 125 horse power electric pump, together with switches connected thereto.

TO HAVE AND TO HOLD The said demised premises, only however to the extent necessary to mine the same for tungsten ore and for no other purpose for a term of three (3) years from the date hereof.

IN CONSIDERATION of this lease, the Lessees covenant and agree as follows, to-wit:

1. To work the same premises in thorough mine-fashion to the end of the safe development and preservation of the same as a workable mine, at all times extracting as much ore therefrom as is possible consistent with safe and prudent mining; and in this connection it is agreed and understood that the Lessor may at its election require the Lessees to produce ore instead of doing development work.

2. To work the demised premises continuously from the dates of this lease, performing at least 40 shifts of work therein underground during each calendar month during the time this lease shall remain in force and effect; any excess labor performed during any calendar month shall not apply on the work required hereunder in any preceding or following calendar month. The work "shift" is taken and accepted to mean the labor of one man for one day of at least 8 hours.

3. To make all shafts and inclines eight (8) feet long by four (4) feet wide in the clear, with bucket ways three and one-half (3-½) by four (4) feet in the clear, and all drifts seven (7) feet high by four (4) feet wide in the clear, provided that existing shafts, drifts and inclines shall, unless otherwise directed by the Lessor, be continued with their present dimensions. The Lessor reserves the right to change the dimensions of any workings as and whenever in the judgment of the Mining Superintendent of the Lessor the same may be necessary or expedient.

4. To do no underhand stoping, whether for the purpose of taking out ore or for any other purpose whatsoever.

5. To neither mine, extract nor remove the ground to a point nearer than four (4) feet to each side of any working shaft, and always to leave at least four (4) feet of ground, in its original condition, to support each such shaft. To leave more than four (4) feet of ground to support each such shaft if the Mining Superintendent of the Lessor shall so direct and to crib or rip-rap any shaft at the Lessees' expense, if the said Mining Superintendent shall so request the Lessees.

6. To allow the officers, agents and representatives of the Lessor at all times to enter upon and into the said premises and all parts thereof for the purpose of inspection and sampling, and to make any surveys they may desire, and to render them all the assistance in the power of the Lessees in so doing.

7. To keep and maintain the drifts, shafts, tunnels and other workings in the said premises thoroughly drained and clear of loose rick and rubbish, and in a safe and secure condition, except as prevented by extraordinary mining casualty, and to maintain at all times and leave the floors of all drifts and workings in good, even and unobstructed condition; to stow no waste underground except with the consent in writing of and under the direction of the Mining Superintendent of the Lessor.

8. To keep posted in conspicuous places on the surface of the said premises all notices which may be furnished by the Lessor for posting thereon.

9. To not assign this lease or any interest therein, nor to sublet the said premises or any part thereof; and to not assign or transfer to anyone any interest in the sums payable by the Lessor, or any other, to the Lessees for ores produced from the demised premises, without the written consent of the Lessor first had and obtained.

10. To pay monthly in advance to the Public Service Company of Colorado its charges for electric power required or to be furnished to the Lessees at the said premises, together with all proper costs of making such power available to the Lessees.

11. The Lessees hereby agree and promise that on or before the 10th day of each calendar month after the date hereof, the Lessees will make, sign and deliver to the Lessor a written report, in duplicate, of the payroll for all operations under this agreement of lease upon the premises hereinabove described, for the preceding calendar month, on such forms as the Lessor and/or the State Compensation Insurance Fund shall direct from time to time; and the Lessees agree and promise that each such report shall be in sufficient detail so that the actual payroll may be ascertained for all operations under this lease upon the demised premises during the preceding calendar month, including the Lessees' own time at Lessees' actual wages, but in any event at not less than the minimum rate of pay fixed from time to time by the State Compensation Insurance Fund or the Industrial Commission of Colorado for a Lessee, and including the payroll of his sublessees and employees, if any, and including the payroll on account of contractors and subcontractors and their employees, if any, so that from such report there may be ascertained the amount of premium payable by the Lessor to the State Compensation Insurance Fund or other insurance carrier for compensation insurance covering the Lessees, his employees and sublessees, if any, and all contractors and subcontractors, if any, and the employees thereof, for operations on the said premises under this lease.

The lesses agree hereby to pay to the Lessor the cost of such compensation insurance as may be carried by the Lessor on account of or for the Lessees and Lessees' sublessees and employees, if any, and on account of each contractor with the Lessee and subcontractor, if any, and the employees of each thereof, if any, because of any operations on the demised premises under this lease; and the Lessees agree to pay the cost of such insurance to the Lessor in cash monthly installments payable on or before the 20th day of each calendar month during the life of this lease for the operations of the preceding calendar month; and the Lessees agree further that the Lessor at its option, may withhold and deduct each such monthly installment, and any unpaid monthly installments, if any, from sums otherwise payable to the Lessees upon ore settlements from operations under this lease, or from any other money due or owing or to become due in any fashion to the Lessee from the Lessor.

LINDER & MENGER
Box 416
Nederland, Colo.

12. The lessees agree to pay to the Lessor and the Lessor reserves of royalty of sixteen (16) per cent of the net proceeds from the sale of any ores produced by the Lessees. The "net proceeds" is agreed to be the net sale price of said ores less the cost of hauling the same to the Lessor's mill at Nederland, Colorado.

IT IS MUTUALLY UNDERSTOOD AND AGREED by and between the Lessor and the Lessees as follows:

(a) The Lessor agrees that as long as it has a market for ore, it will maintain what it considers a fair schedule of prices for tungsten ore produced from the property owned and leased by it. The Lessor shall have the right to purchase and the Lessees agree to sell to the Lessor all ore produced by the Lessees from the leased premises provided said schedule of prices maintained by the Lessor is at least equal to the price offered to Lessees by any other party. In the event the said Lessees are able to sell said ore at a net price higher than offered by the Lessor, the Lessees shall have the right to sell the ore to the buyer offering a higher net price. In event any of said ore is sold to anyone other than the Lessor, the Lessor shall be notified immediately the name of the purchaser and the Lessor shall be furnished with a weight ticket showing the weight of each load of ore so sold and the date of such shipment. Any ore sold to anyone other than the Lessor shall be sold in the names of the Lessor and Lessees, and all checks in payment of ore shall be issued in the name of the Lessor and Lessees, and the Lessor shall be furnished with a settlement sheet showing the sale of all ore.

(b) It is further agreed that no hauling charges in excess of hauling said ore to Lessor's market shall be deducted in the event said ore is sold to anyone other than the Lessor.

(c) It is further mutually understood and agreed that in the event the Lessees deliver to the Lessor shipments or lots of ore of a value less than $100.00 per lot, that the Lessees shall pay to the Lessor the cost of milling such ore and the cost of sampling the same.

(d) It is further mutually understood and agreed that in the event the Lessees fail to pay the royalty herein reserved, or fails to pay compensation insurance premiums, the Lessor shall have the right to terminate this lease immediately and without notice to the Lessees. In the event of the violation of any other term, provision or condition of this lease by the Lessees, the Lessor shall have the right to terminate this lease upon giving thirty (30) days written notice to the Lessees. In the event the Lessees correct any such defaults within thirty (30) days, said lease shall not be terminated. In the event any default shall not be corrected at the end of said thirty-day period, then said lease shall be terminated as of the end of said thirty-day period. Said notice shall be given in writing, addressed to the Lessees at Nederland, Colorado.

(e) The title to any ores broken or mined on said leased premises at the termination of this lease, shall be the property of the Lessor, and it shall not be liable for the payment to the Lessees for the same before any cost or expenses of breaking or mining said ore.

(f) It is mutually understood and agreed that the Lesses shall keep said hoist, pump, motors, and other equipment, leased hereby, in good condition and shall upon the terms of this lease deliver the same to the Lessor in as good a condition as when received, ordinary wear and tear accepted.

LINDEN A. BLANKET
Box 416
Nederland, Colorado

(g) It is mutually understood and agreed that the Lessees hold this lease in the following proportions: Tom Linder 37½ per cent, George Menger 37½ per cent, and Morris A. Castagne 25 per cent thereof.

(h) The lessor covenants and agrees with the Lessees that the Lessees shall have the right to apply for and obtain a United States Government loan for the operation of said property and in the event such a loan is approved the lessor agrees that it will execute all instruments required by the United States Government in order that said loan may be obtained. It being understood and agreed that the lessor will cooperate in the obtaining of said loan and sign all necessary instruments including subrogation agreements required by the Government.

In the event such loan is approved by the United States Government the Lessees shall have the right to extend the term of this lease for such term as may be required by the United States Government and the Lessees will execute and extension agreement in accordance with the requirements of the United States Government.

IN WITNESS WHEREOF, the lessor has caused its name to be hereunto subscribed by its President and attested by its Secretary and its seal hereunto affixed, and the lessees have hereunto set their hands and seals the day and year first above written.

METZER MINES, INC.,

By: /S/ Elmer Metzer
President

ATTEST:

/S/ Dallas I. Hutchinson
Secretary

(SEAL)

/S/ Tom Linder

/S/ George A. Menger

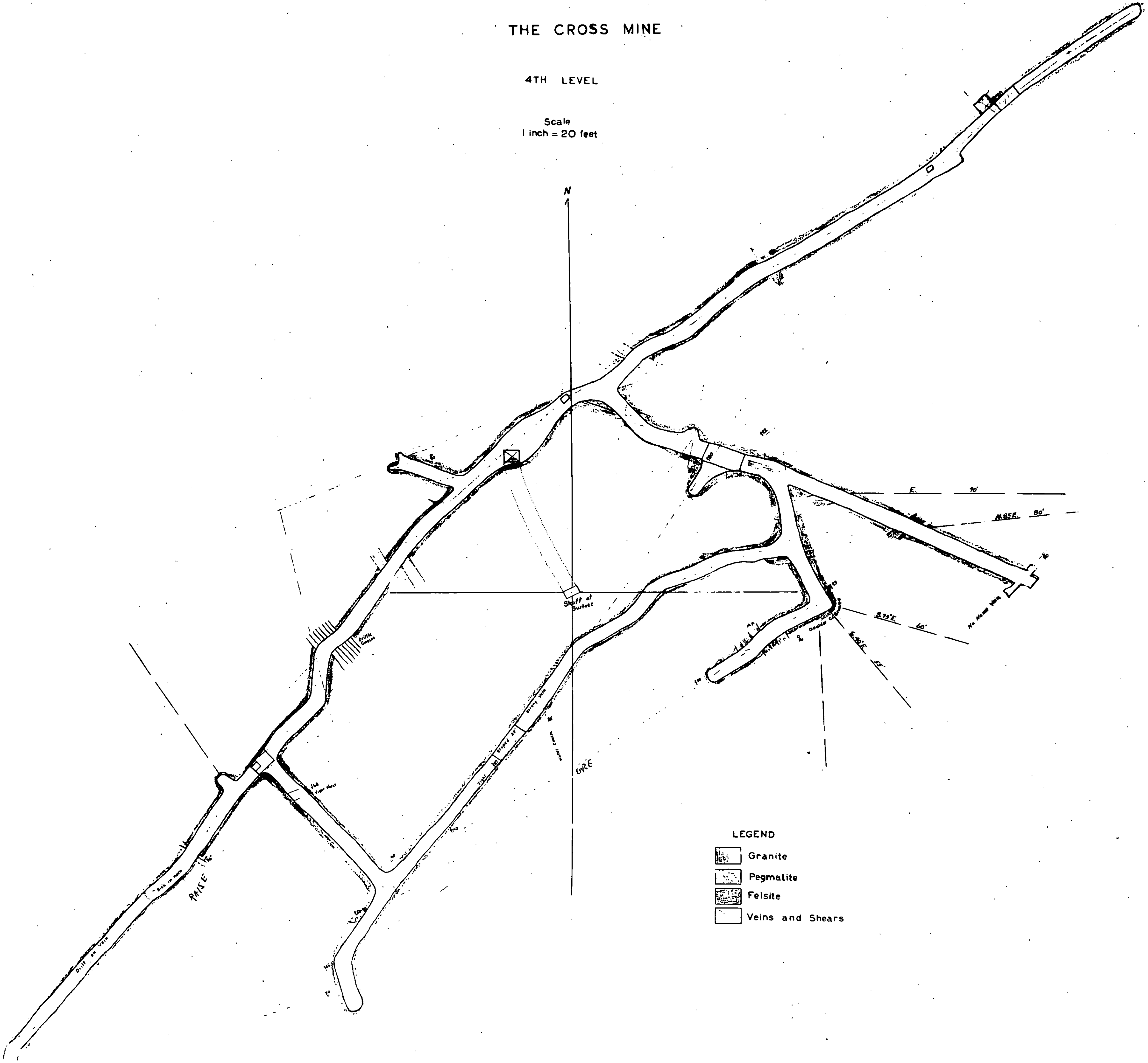
/S/ Morris A. Castagne

Metzer & Linder
Box 416
Nederland, Colorado

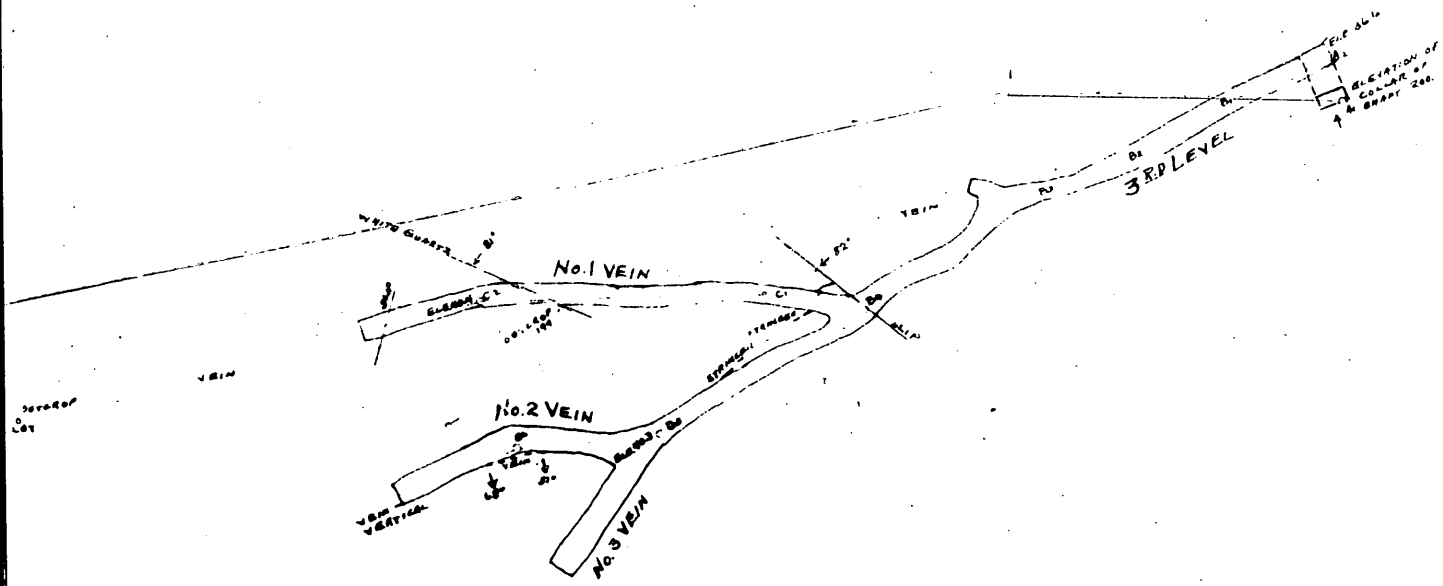
THE CROSS MINE

4TH LEVEL

Scale
1 inch = 20 feet



SEC. 8
T1S. R72W OF THE 6TH P.M.



CROSS NO. 1 SHAFT.

SCALE 50 FT = 1 INCH

SURVEYED JAN. 24, 1916

F. C. ARMSTRONG. E.M.

LEGEND

RED LINES ARE SURVEY LINES

YELLOW LINES ARE VEINS ON SURFACE, BEARINGS

BY H. G. OLSON

ELEVATION OF COLLAR OF SHAFT TAKEN

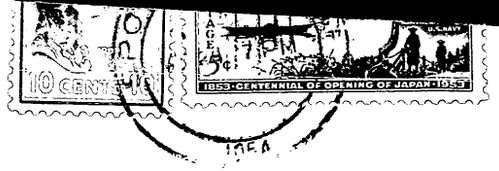
AT 200. NUMBERS AT OUTCROPS ARE ELEVATIONS

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

OFFICIAL BUSINESS

U. S. GEOLOGICAL SURVEY
SC 137 HOWARD ST.
SPOKANE 4, WASHINGTON

SPOKANE, WASH.
MAY 26 7 PM
1954

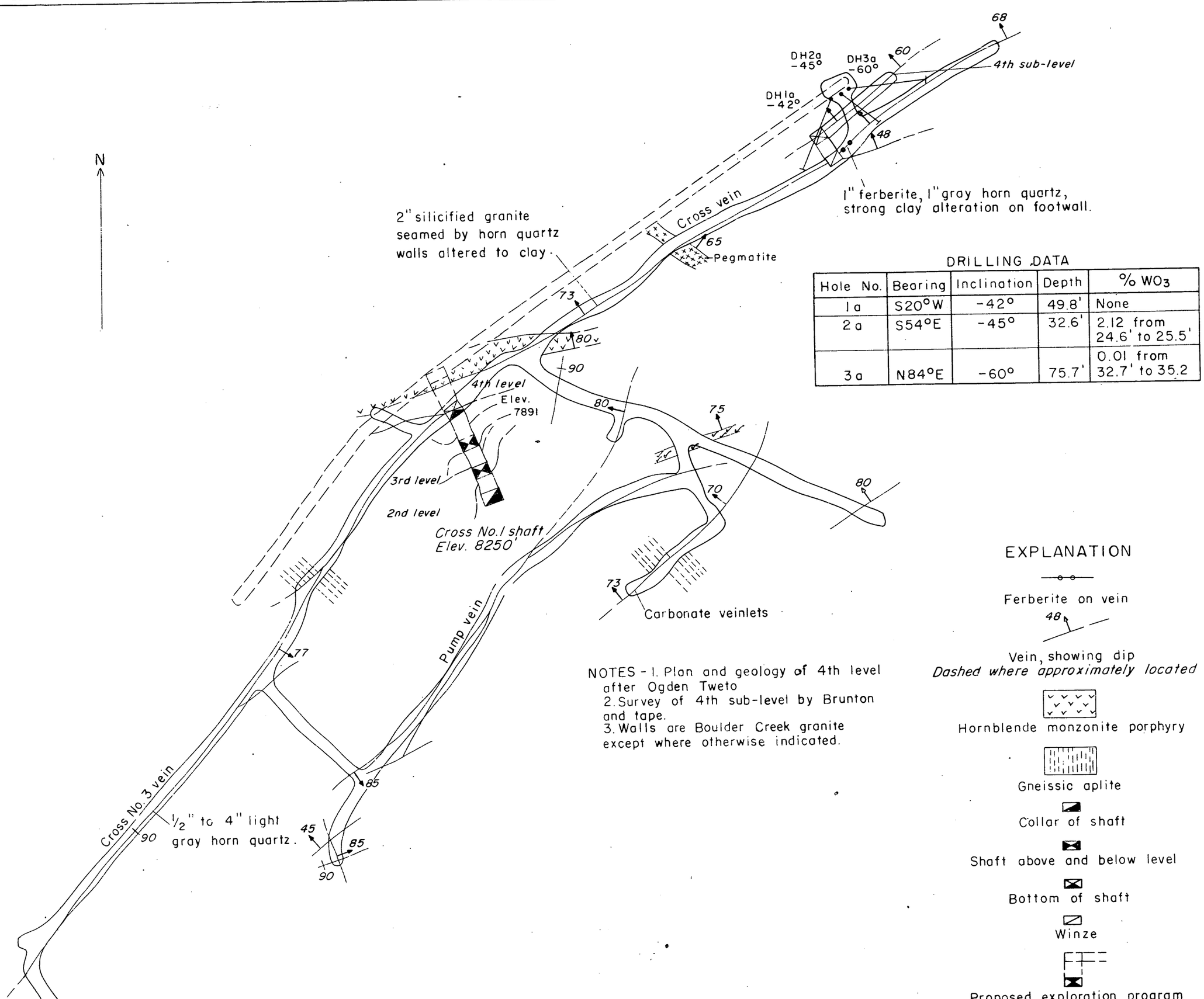


9-160 C
RETURN IF NOT DELIVERED
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, $300
(GPO)

OFFICIAL BUSINESS

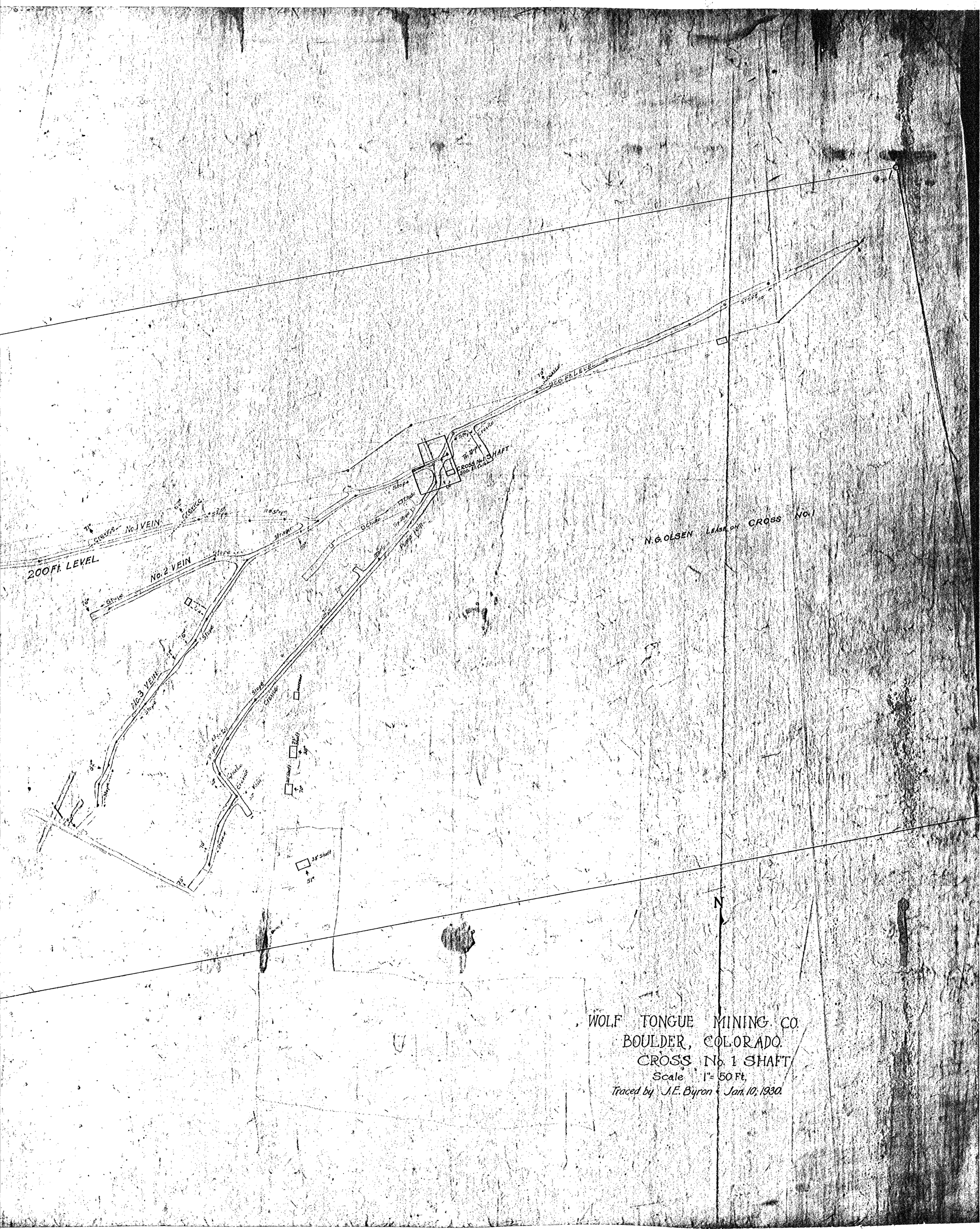
Mr. George C. Selfridge
Chairman, Operating Committee
Defense MineralsExploration Administration
Department of the Interior
Washington 25, D. C.



DRILLING DATA

Hole No.	Bearing	Inclination	Depth	% WO_3
1a	S20°W	-42°	49.8'	None
2a	S54°E	-45°	32.6'	2.12 from 24.6' to 25.5'
3a	N84°E	-60°	75.7'	0.01 from 32.7' to 35.2

NOTES - 1. Plan and geology of 4th level after Ogden Tweto
2. Survey of 4th sub-level by Brunton and tape.
3. Walls are Boulder Creek granite except where otherwise indicated.


200 Ft. LEVEL
No. 1 VEIN
No. 2 VEIN
No. 3 VEIN
Stope
Crevice
Stringer
Chute
Top Stope
Pump Lift
CROSS No. 1 SHAFT
500 Ft. Crevice
Tri. Stope
400 Ft. LEVEL
N.G. OLSEN LEASE ON CROSS No. 1
35' Shaft
N
WOLF TONGUE MINING CO.
BOULDER, COLORADO.
CROSS No. 1 SHAFT
Scale 1" = 50 Ft.
Traced by J.E. Byron Jan. 10, 1930.