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

COPY

224 New Customhouse
Denver 2, Colorado

December 1, 1954

Mr. George B. Friden
850 Reed Street
Lakewood 15, Colorado

Re: Docket DMEA 3527

Dear Mr. Friden:

Reference is made to your application for Government aid on the #½ of SE¼, Sec. 19, T. 3 S., R. 70 W., Jefferson County, Colorado.

A careful study of your property indicates that your extensive exploration program is not justified by any mineralization manifested at this time. Rehabilitation of a caved shaft of unknown depth is not considered to be exploration. Under these circumstances, your application is denied without prejudice.

It is suggested that should you elect to rehabilitate the Ladwig No. 2 shaft at your own expense and thereby disclose mineralization which you believe would warrant a definite exploration program, we would be pleased to give consideration to a new application for DMEA aid on your property.

Very truly yours,

/s/ W. H. King

/s/ E. N. Harshman for
A. H. Koschmann
DMEA Field Team, Region IV

HMC:dm
cc: Administrator
DMEA
AHKoschmann
WMTraver
ALBrokaw
AEC
Mining Division
Subject
Chron.

Reviewed by
DMEA OPERATING COMMITTEE
12-10-54
(date)

12/13/54 gh

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

W. H. King

for E. N. Hawkins

Reviewed by
DMEA OPERATING COMMITTEE
12-10-54
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

DEPARTMENT OF THE INTERIOR
Bureau Mines Administration
RECEIVED
DEC - 3 1954

W J King

Reviewed by
DMEA OPERATING COMMITTEE
12-10-54
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Region IV

Building 20, Room 137
Denver Federal Center
Denver 2, Colorado
November 10, 1954

Memorandum

To: Executive Officer, DMEA Field Team, Region IV

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

Subject: DMEA 3287 (Uranium) George B. Fallen lease (S1/2 of SE1/4 Sec. 19, T. 3 S., R. 70 W.) Jefferson County, Colo.

Enclosed are the original and 10 copies of a "Summary, Conclusions, and Recommendations" by C. M. Harrer, Bureau of Mines and D. R. MacLaren, Geological Survey, and of Harrer's engineering report on the above docket.

Harrer concludes that while the presence of uranium can only be inferred in the Ludwig No. 2 shaft, mine workings that are found on the dump, there is evidence enough to justify a small amount of work. He recommends extending an existing adit after it is rehabilitated, to underneath the shaft. If the shaft extends to the adit level, it will be cleaned out and if it does not extend to that depth, a raise will be driven to connection with the bottom of the shaft from the adit. He suggests a short-form unit cost contract and estimates the cost as $4,577.50 with 2 months required to complete. Costs will be increased in case it is necessary to raise to the shaft.

I approve his recommendations.

The estimated costs are too much, but are a close enough approximation for the amount and type of work proposed. The program was discussed with Atomic Energy Commission personnel.

The applicant indicates in a conference with the examiners that the modified proposal would be acceptable. It would appear, however, that before a contract is entered into he should be notified that he will be required to substantiate all the property shown as owned by him in his application.

The brochure provided with your memorandum of October 6, 1954, instructing us to make a field examination and submit a suitable report is also returned.

W. M. Traver

W. M. Traver

Reviewed by
DMEA OPERATING COMMITTEE
12-10-54
(date)

WMT/ij
Enclosures
cc: 10
DMEA 3287 Chron

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Defense Minerals Exploration Administration
Denver Federal Center
Denver 2, Colorado

November 4, 1954

Memorandum

To: DMEA Field Team, Region IV

From: A. H. Hauchmann

Subject: DMEA Docket 3327, Ludwig No. 2 Mine, Jefferson County, Colorado

Enclosed are 11 copies of a geologic report by D. R. MacLaren of the U. S. Geological Survey covering the above docket.

Pitchblende is associated with base metal sulfides at several localities where carbonate-breccia rests intersect bands of hornblende gneiss. The Ludwig No. 2 shaft has apparently been driven on one of these intersections and dump material indicates the presence of pitchblende in the shaft or the workings from it.

MacLaren concludes that the program proposed by the applicant is more extensive than is warranted by the ore potential of the area proposed for exploration. He recommends a reduced program of drifting and raising to explore the zone in which ore may occur.

I concur in this recommendation.

The brochure is also enclosed.

E.M. Hauchman
for A. H. Hauchmann
Supervising Geologist
Colorado-Wyoming

Enclosures (12)

Reviewed by
DMEA OPERATING COMMITTEE
12-10-54
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA 3527

The George R. Fritzen Lease

Jefferson County, Colorado

Uranium

D. H. Mclaren, Geologist
Geological Survey

C. M. Harrer, Mining Engineer
Bureau of Mines

October 29, 1954

Reviewed by
DMEA OPERATING COMMITTEE
12-10-54
(date)

DMEA 3527

THE GEORGE B. FRIDEN LEASE
JEFFERSON COUNTY, COLORADO

Summary, Conclusions, and Recommendations

By D. K. Maclaren
Geologist
Geological Survey

C. M. Harrer
Mining Engineer
Bureau of Mines

Reviewed by
DMEA OPERATING COMMITTEE

12-10-54
(Date)

DMEA 3527

THE GEORGE B. FRIDEN URANIUM LEASE JEFFERSON COUNTY, COLORADO

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

By D. R. Maclaren and C. M. Harrer

George B. Friden of 850 Reed St., Lakewood 15, Colo., has applied for a Defense Minerals Exploration Administration loan of $39,450.00 to explore for uranium at the old Ludwig No. 2 prospect which he has under 10 year lease.

The property to be explored is in the S1/2, SW1/4 sec. 19, T 3 S., R 70 W., Jefferson County, Colo., and was investigated in the field by a Region IV, Defense Minerals Exploration Administration examining team, October 21, 1954.

Interlayered belts of gneiss and schist of the Idaho Springs formation (pre-Cambrian), striking N.75° to 80° E., are cut by northerly to northwesterly trending fault zones filled by carbonate breccia. Pitchblende associated with base metal sulfides has been found at 6 localities within a belt of hornblende gneiss in or along the walls of the breccia zones.

At the Ludwig No. 2 shaft uranium and associated copper minerals have been found in the dump, indicating the existence of a vein containing appreciable amounts of these minerals in the caved portion of the shaft. It is concluded that the evidence available in this area indicates that the discovery of a small amount of uranium ore appears no more than fair, and does not justify the applicants extensive exploration program. However, exposure and examination of

the indicated vein could change this conclusion. Therefore, although the work can be considered more in the nature of prospecting than exploration a modified exploration program, including rehabilitation and extension of an existing 90-foot adit to the Ludwig No. 2 shaft and cleaning out the shaft from the adit at an estimated cost of $4,577.50, which could be completed in 2 months, is recommended; Government participation at 75 percent would be $3,433.13.

Because the depth of the shaft is unknown, the possibility exists that a raise may be required from the adit to the actual shaft bottom. This could be driven at a cost of $5.50 per foot more than the estimated shaft rehabilitation cost, or $30.00 per foot. A short-form unit cost contract is suggested.

The program recommended by the examining team was discussed with the applicant on November 12, 1954.

LADWIG NO. 2 MINE

JEFFERSON COUNTY, COLORADO

DMEA REPORT 3927

Geologic Report

By D. J. Nackarna
U. S. Geological Survey

Reviewed by
DMEA OPERATING COMMITTEE
12-10-54
(date)

LADWIG NO. 2 MINE
JEFFERSON COUNTY, COLORADO

INTRODUCTION

George G. Frisbie of Lakewood, Colorado, has applied to the Defense Minerals Exploration Administration for assistance to explore for uranium in the Ladwig No. 2 mine, Tucker Gulch, Jefferson County, Colorado. The applicant proposes to construct about one mile of access road, to install surface facilities, to reopen and rehabilitate a caved shaft said to be 100 feet deep, to drill 1,[illegible] feet of holes, 1,000 feet by percussion drill and 400 feet by diamond drill, to deepen the shaft 70 feet, and to drift a total of [illegible] feet from the shaft. The applicant estimates that the total cost of this proposal will be $[illegible] of which the Government's share will be 75% or $[illegible].

The applicant's property comprising the E½ of the SE 1/4, sec. 19, T. 3 S., R. 70 W., 6th P.M., is about three and one-half miles northwest of Golden, Colorado. State highway 58 passes through the northern end of the property, about 700 feet north of the proposed site of operation, making the property easily accessible throughout the year.

An examination was made October 15, 1954, in the company of E. F. Burnal of the U. S. Geological Survey. Mr. Burnal is a co-author with J. W. Adams and R. H. Gude 3rd, of Geological Survey Circular 300, Uranium Occurrences in the Golden Gate Canyon and Ralston Creek areas, Jefferson County, Colorado (1953), and his knowledge of the area was very helpful. The applicant was not able to be present for the first examination, but a second examination was made October 21, 1954, in the

company of C. E. Harrer of the U. S. Bureau of Mines and George H. Fridley, applicant. As a supplement to the field examination, the geology of the area was discussed with J. W. Adams, D. R. Theriden, and C. H. Merrill of the U. S. Geological Survey. Mr. Theriden and Mr. Merrill are currently engaged in mapping the geology of the area. The problem was further discussed with Ray Harvey and Roger Hulen, geologists for the Denver Exploration Branch of the Atomic Energy Commission, who have done considerable work on the geology of the area.

It is concluded from all the available information that the chance of making a significant discovery is, at best, only fair and that the extensive program proposed by the applicant is not warranted. However, the evidence, in the mined portion of the shaft, of a sulfide vein containing appreciable amounts of uranium associated with copper silicate indicate many fragments on the dump. An examination of this vein in place could offer this conclusion entirely. Therefore a reduced program, which may actually be more in the nature of prospecting than exploration, estimated by the Bureau of Mines to cost $4,277.20 (Government's share 75% or $3,208.12) is recommended. The Atomic Energy Commission representatives agree with these conclusions and recommendations.

GEOLOGY

The geology of the area is described by J. W. Adams, A. J. Cook, Jr., and C. P. Barnes in Geological Survey Circular 280 (1953). The rocks are interlayered beds of schist and gneiss of the Hillis Springs formation of pre-Cambrian age. The beds trend N. 75° to 80° E. and dip to the north. They are cut by a series of northerly-to northwesterly-trending brecciated, carbonate-bearing fault zones. Pitchblende, associated with

base metal sulfides, has been found at six localities within a belt of hornblende gneiss, 150 to 200 feet wide. Each locality is within or along the walls of an intersecting fault zone. Adams reports the assay results of 30 samples taken in this belt. The highest assay is 6.98% UO_2 over a width of .3 feet. This sample was taken from an inclined shaft about 1,750 feet east of the Ludwig No. 2 mine. Nine other assays range in grade from .13% UO_2 to 1.48% UO_2, while the remaining twenty are all less than .13% UO_2.

At the Ludwig No. 2 mine (figure 3) a slightly radioactive breccia zone, one to three feet wide, striking N. 10° W. and dipping 80° E. is vertically cut across a 175-foot wide belt of hornblende gneiss that strikes N. 75° to 85° E. and dips 70° to 80° N. An old shaft, sunk on the breccia, is said to be 150 feet deep but is plugged about 15 feet below the collar. The accuracy of the estimated depth is questionable as the estimate is based upon the statement of an "old timer" who claims that as a child boy, his father took him down the shaft. The present size of the dump is not too good a criterion as its original size might have been augmented by any drifting from the shaft, and there is no way of estimating the extent to which the original size may have been decreased by erosion during the years. The breccia exposed in the upper portion of the shaft is composed of fragments of carbonate rock and altered gneiss. Both the breccia and the gneiss, for a distance of one to five feet from the contact, are oxidized and heavily iron-stained. In the dump about the shaft are pieces of limonite-stained breccia and fragments of copper-stained, vein-like material that contain pitchblende and some torbernite. Neither uranium nor copper minerals were found in

the shaft by the engineers although Duval states that he had found one small streak containing pitchblende in 1953. Measured with a geiger counter, radioactivity varied from .005 to .010 MR/hr on the walls of the shaft, and from .02 to .04 MR/hr on the upper portion of the dump. A selected piece of vein-like, copper-stained material taken from the dump showed radiation up to .15 MR/hr. Atomic Energy Commission geologists reported radiation of as much as .5 MR/hr in a zone lower down the slope of the dump. Adams (1953) collected a grab sample of carbonate breccia from the dump that contained pitchblende and copper minerals and assayed .35% U_3O_8, 0.35% Cu, .19% Pb, .10% Zn, and .8% $CaCO_3$.

About 45 feet north of the shaft and 19 feet above the collar, an adit has been driven about 11 feet along the breccia. No uranium or copper minerals were found in the adit and radioactivity was nil to very weak. However, at the adit portal radiation up to .01 MR/hr was recorded.

About 135 feet south of the shaft and 72 feet below the elevation of the collar, an adit about 32 feet long has been driven parallel to and on the breccia. No uranium or copper minerals were found in this adit, and radioactivity was nil in the hornblende gneiss to very weak in the carbonate breccia.

About 150 feet east of the shaft a recent trench is on a northerly trending shear zone. Vein-like copper-stained streaks at the north end of the trench gave radiations of .01 to .02 MR/hr and the trench as a whole gave only .005 MR/hr. Although no breccia was exposed in the trench, there may be another such zone a few feet to the east. Adams (1953) says of an old shallow cut about 20 feet to the north, "... radioactive samples, probably derived from another breccia zone, were found in the debris from the lower of two earlier cuts about 100 feet

east of the shaft. Copper minerals, notably azurite, are conspicuous on the dump where the uranium minerals are found.---".

CONCLUSIONS AND RECOMMENDATIONS

From the information available at this time it is concluded that:

1. Pitchblende associated with basic silicate minerals has been found at six localities along the intersections of carbonate-breccia fault zones with a belt of hornblende gneiss.

2. That a shaft of indeterminate depth is at one such intersection at the Ludwig No. 2 mine.

3. That material on the dump about the shaft indicates the possible existence in the shaft of a vein containing appreciable amounts of uranium and copper minerals.

4. That the chance of making a significant discovery of uranium ore is not sufficiently indicated to justify the proposed program, and

5. That recovery and examination of the indicated vein might entirely change these conclusions.

It is recommended that the program submitted by the applicant be denied. However, although it might be said in the nature of prospecting than exploration, a modified program to permit examination of the indicated uranium bearing vein is recommended for approval.

MODIFIED PROGRAM

The existing tunnel about 72 feet below the collar of the shaft (Figure A) should be extended about 30 feet along the breccia to connect with the shaft, and the shaft should then be made accessible from this drift. In event the shaft does not extend to the drift level, raising

to the bottom of the shaft should be allowed. Upon completion of this work a reexamination and reappraisal should be made to determine whether or not approval of the original application might then be justified. The Bureau of Mines estimates that the cost of this recommended program will be $4,377.50 (Government's share 75% or $3,433.13).

As the portal of the lower tunnel is only about 600 feet from State Highway 50 which has a cleared bridge wide enough to haul a portable compressor off the road, the proposed work can be done without the necessity of any access road or surface installation other than a shed for a compressor and the laying of a pipeline from the highway to the portal of the tunnel.

DMEA 3587

THE GEORGE B. FRIDEN LEASE
JEFFERSON COUNTY, COLO.

Engineering Report

By C. M. Harrer
Mining Engineer
Bureau of Mines

Reviewed by
DMEA OPERATING COMMITTEE
12-10-54
(date)

DMEA 3527

THE GEORGE B. FRIDEN LEASE
JEFFERSON COUNTY, COLORADO

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* See figure with geologic report.

DMEA 3587

THE GEORGE B. FRIDEN LEASE
JEFFERSON COUNTY, COLO.

ENGINEERING REPORT

By C. M. Harrer

INTRODUCTION

George B. Friden, of 850 Reed Street, Lakewood 15, Colo., has applied for a Defense Minerals Exploration Administration loan of $38,450.00 to explore for uranium at the old Ludwig No. 2 mine which is included within his lease.

The property has been visited by members of the Atomic Energy Commission during 1954 and was studied by the Geological Survey during 1951-52. 1/

The property was examined for the Region IV, Defense Minerals Exploration Administration by the writer, accompanied by Don H. Maclaren of the Geological Survey, and George B. Friden, the applicant, on October 21, 1954.

ACKNOWLEDGMENTS

Jack W. Adams, geologist for the Geological Survey, and R. C. Dorsey of the Atomic Energy Commission made the results of prior investigations by their agencies, available to the examining team. George B. Friden, loan applicant, accompanied the examining team and cooperated fully by providing all information at his disposal.

1/ Adams, J. W., Gude, A. J., Boroni, E. P. Uranium Occurrences in the Golden Gate Canyon and Ralston Creek Areas, Jefferson County, Colorado: U. S. Geol. Survey Circular 320.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The George B. Fridon lease includes the old Ludwig No. 2 copper prospect in sec's. 19 and 20, T. 3 S., R. 70 W., Jefferson County, Colo., (fig. 1 and 2) at altitudes ranging between 6,500 and 7,000 feet above sea-level. The property is about 3 miles west of Golden on Colorado State Highway 58. The terrain is steep and rugged. Supplies are readily obtainable from Golden and Denver.

HISTORY AND PRODUCTION

The property is owned by Lyman C. Ludwig. There is no official record of either copper or uranium production.

OWNERSHIP AND EXTENT

George B. Fridon of 850 Reed St., Lakewood 15, Colo., holds a mineral lease on 600 acres of land (fig. 2) in sec's. 19 and 20, T. 3 S., R. 70 W., Jefferson County, Colo. The lease includes all minerals except oil and gas and particularly mentions uranium. The lease is the culmination of a prior agreement and is in effect from September 15, 1954 to September 15, 1964, and as long thereafter as minerals are found in paying quantities and are continually mined. This lease cannot be assigned or subleased without written consent of the owner, Lyman C. Ludwig. It includes the SW1/4 of the N1/2 of the NE1/4; and the SE1/4 of the NE1/4 of sec. 19; all of the S1/2 of sec. 20, except the SE1/4 of the NW1/4 thereof, (fig. 2).

George B. Fridon proposes to subordinate only the S1/2 of the SE1/4 of sec. 19, T. 3 S., R. 70 W. This 80 acres includes the old Ludwig No. 2 copper prospect, which he desires to explore.

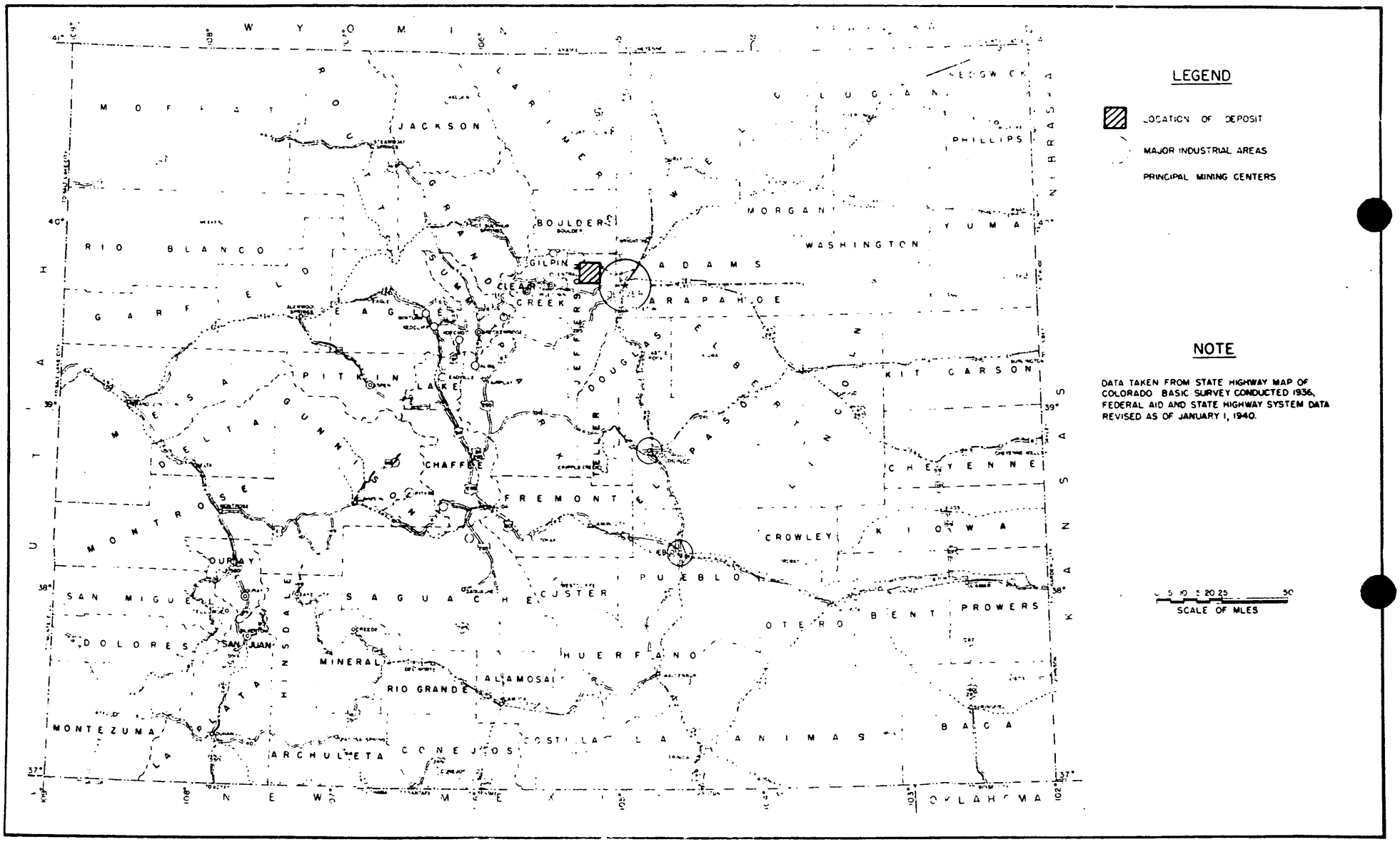


FIGURE 1 - LOCATION MAP, GEORGE B. FRIDEN LEASE, JEFFERSON COUNTY, COLO. (DMEA 3527)

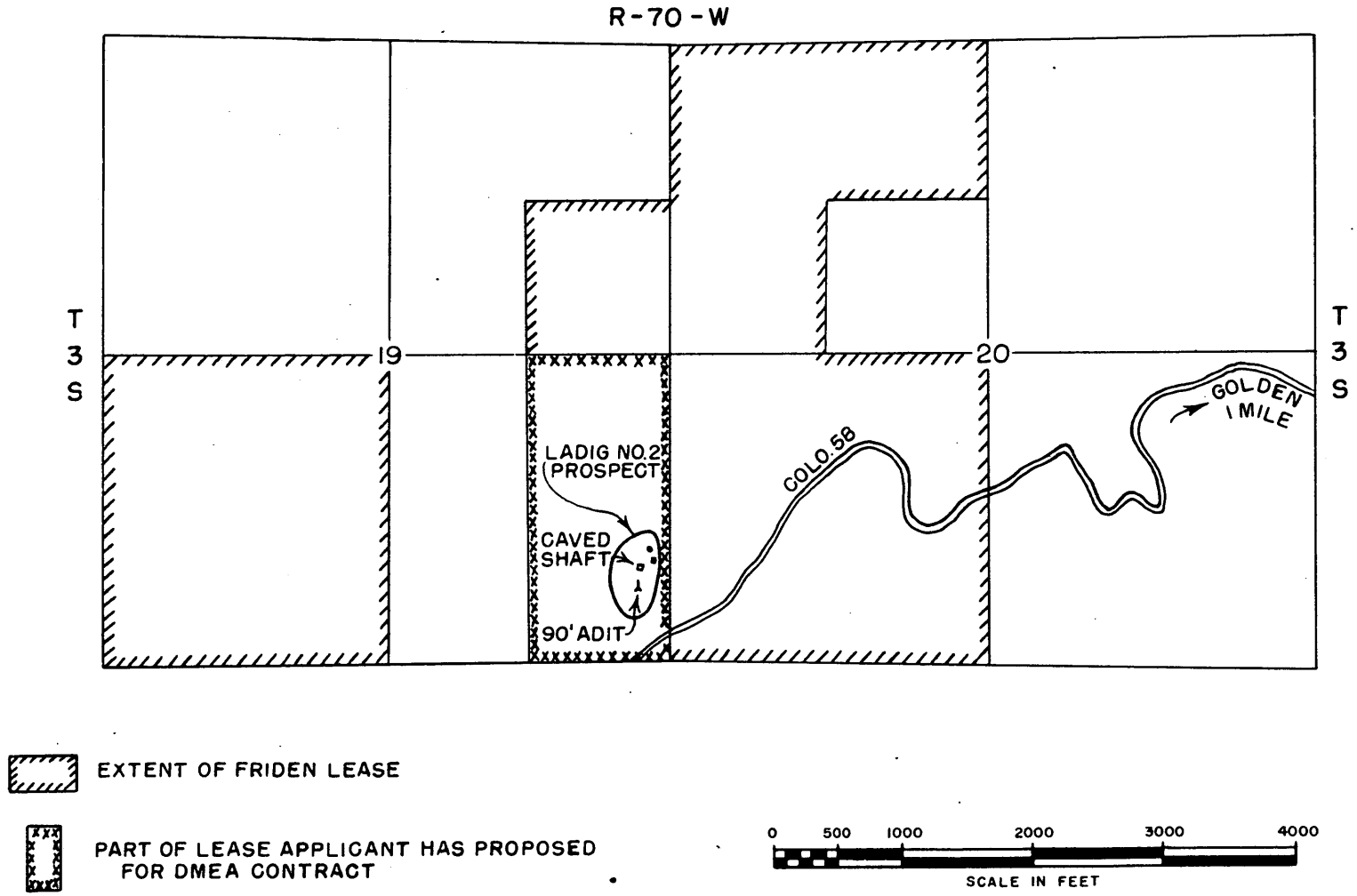


FIGURE 2 - PROPERTY MAP, SHOWING LOCATION OF PROPOSED EXPLORATION, GEORGE B. FRIDEN LEASE, JEFFERSON COUNTY, COLO. (DMEA 3527)

DESCRIPTION OF THE DEPOSIT

The Ludwig No. 2 prospect is one of several copper and uranium occurrences within an area of pre-Cambrian gneisses and schists along the flanks of the Front Range; about 3 miles west of Golden, Colo. Uranium occurs as the minerals pitchblende and uraninite (?). A grab sample 2/ from an old dump made up of carbonate breccia, with pitchblende and copper minerals assayed 0.30 percent uranium, 0.25 percent copper, 0.10 percent lead, 0.10 percent zinc, and 0.2 percent calcium carbonate per ton.

The uranium mineralization appears to be limited to a zone of fine grained hornblende gneiss about 150 to 200 feet wide, which has been cut by a carbonate bearing breccia fault z ne 1 to 6 feet wide.

No uranium minerals were found in place, but specimens collected from the shaft dump are reported to contain pitchblende and torbernite in limonite stained breccia. Copper minerals, notably carbonates, can be seen on the dump of the Ludwig No. 2 shaft. This shaft is caved and wholly inaccessible. It has been variously estimated as up to 100 feet deep. This estimate is little more than a guess, since any rock from underground excavations, other than from the shaft itself would make the estimated depth unreliable.

MINEABLE ORE RESERVES

No data is available on which to base an estimate of any type of ore reserves.

2/ Work cited in footnote 1/

PRESENT STATUS

Exploration and Development

The Ladwig No. 2 prospect has been explored (fig. 4) by a 33-foot adit which is accessible although its portal is partially caved. The Ladwig No. 2 shaft, estimated at 4 x 5-foot cross-section is caved to within 10 feet of the collar. Its depth is reported by the applicant as about 100 feet, however, this is little more than a guess. Several shallow caved pits are located in the vicinity. The property has long been dormant and no data is available on early history.

Mining and Milling Equipment and Other Facilities

No mining, milling or other equipment of any kind are available on the property.

APPLICANTS PROJECT PROPOSALS, WITH COSTS

The applicant proposes to explore further the uranium indications on the Ladwig No. 2 prospect. The prospect is presently accessible by State Highway 58 to within about 400 feet from which point access is by steep trail only.

He plans first to make the prospect accessible with approximately one mile of road suitable to truck in equipment, supplies and men to carry on an exploration program. Cost of the road includes the following items and costs:

Bulldozer operation for 150 hours at $16.00 per hour	$ 2,400.00
Culverts	600.00
Rock removal	600.00
Road maintenance for one year (Bulldozer 50 hours at $12.00 per hour)	600.00
Total	$ 4,200.00

Secondly, upon completion of the road, he proposes to purchase and install surface facilities as follows:

A 15 x 30-foot building at $4.50 per square foot	$2,025.00
Heating facilities and seasons fuel	250.00
Fuel tanks	75.00
Workbench and bins	150.00
Hoist, bucket and cable	2,500.00
Head frame, foundation, installation	2,100.00
Small hand tools	250.00
Miscellaneous and haulage	1,100.00
Total	$8,450.00

Thirdly, he proposes to rehabilitate the Ludwig No. 2 shaft, including cleaning out and timbering where necessary, at $40.00 per foot. He estimates a depth of 100 feet for $4,000.00 and includes the taking, transportation and assaying of 20 samples at $27.50, for $550.00 , total $4,550.00.

Fourthly, if examination of the shaft proves encouraging, he proposes percussion and diamond drilling as follows:

Drill site preparation (Bulldozer 50 hours at $15.00)	$ 750.00
Up to 1,000 feet of percussion drilling for probing, at $1.50	1,500.00
Up to 800 feet of core drilling at $4.50 per foot	3,600.00
Taking, transporting and assaying 20 samples at $27.50	550.00
Total	$6,400.00

Fifthly, if drilling proves encouraging, he proposes to sink the shaft for about 70 feet at $100.00 per foot; $7,000.00

and to drift about 70 feet at $40.00 per foot; 2,800.00

and take, transport, and assay 20 samples at $27.50 each 550.00

Total $10,350.00

Total cost of the project, in all its stages was estimated at $33,950.00. A salvage value of $1,500.00 would reduce the cost to $32,450.00.

Work would be completed within one year.

EXAMINING TEAM'S PROPOSAL

Since the presence of uranium has been established by the examination of dump material at the Ludwig No. 2 shaft, evaluation of this and similar deposits would be facilitated by making the Ludwig No. 2 shaft accessible for examination. This can be accomplished by removing the caved material in the shaft from the top down at a cost estimated at $3,442 or by entering and rehabilitating, an existing 90-foot adit on the same geologic structure and about 70 feet below the shaft collar, extending the adit about 30 feet from its present face to make a connection with the shaft and cleaning out the shaft from the adit level (fig. 4) for an approximate cost of $4,578. The latter is recommended because the drift would explore the geologic structure, in depth, to the shaft and also make the shaft more readily accessible. Furthermore, if the shaft does not expose the vein sufficiently for its evaluation, sinking it to the adit level at a cost of about $100 per foot would be more costly than raising from the end of the extended adit at an estimated cost of $30.00 per foot. Cost data for the proposals are as follows:

Estimated Cost of rehabilitating the Ludwig No. 2 shaft from the collar to an estimated depth of 100 feet, (assuming 20 feet of advance per 6 day week) which includes delays and collar preparation.

	Per Week	Cost Per Foot	
Labor and Supervision			
1 foreman-miner at $2.00 per hour; plus overtime	$ 104.00	$5.20	
2 miners at $1.75 per hour; plus overtime	182.00	9.10	
Labor cost per foot - 20 feet per week			$14.30
Operating Materials and Supplies			
Timber (stulls, lagging, wedges, nails, where required, and ladders)			4.00

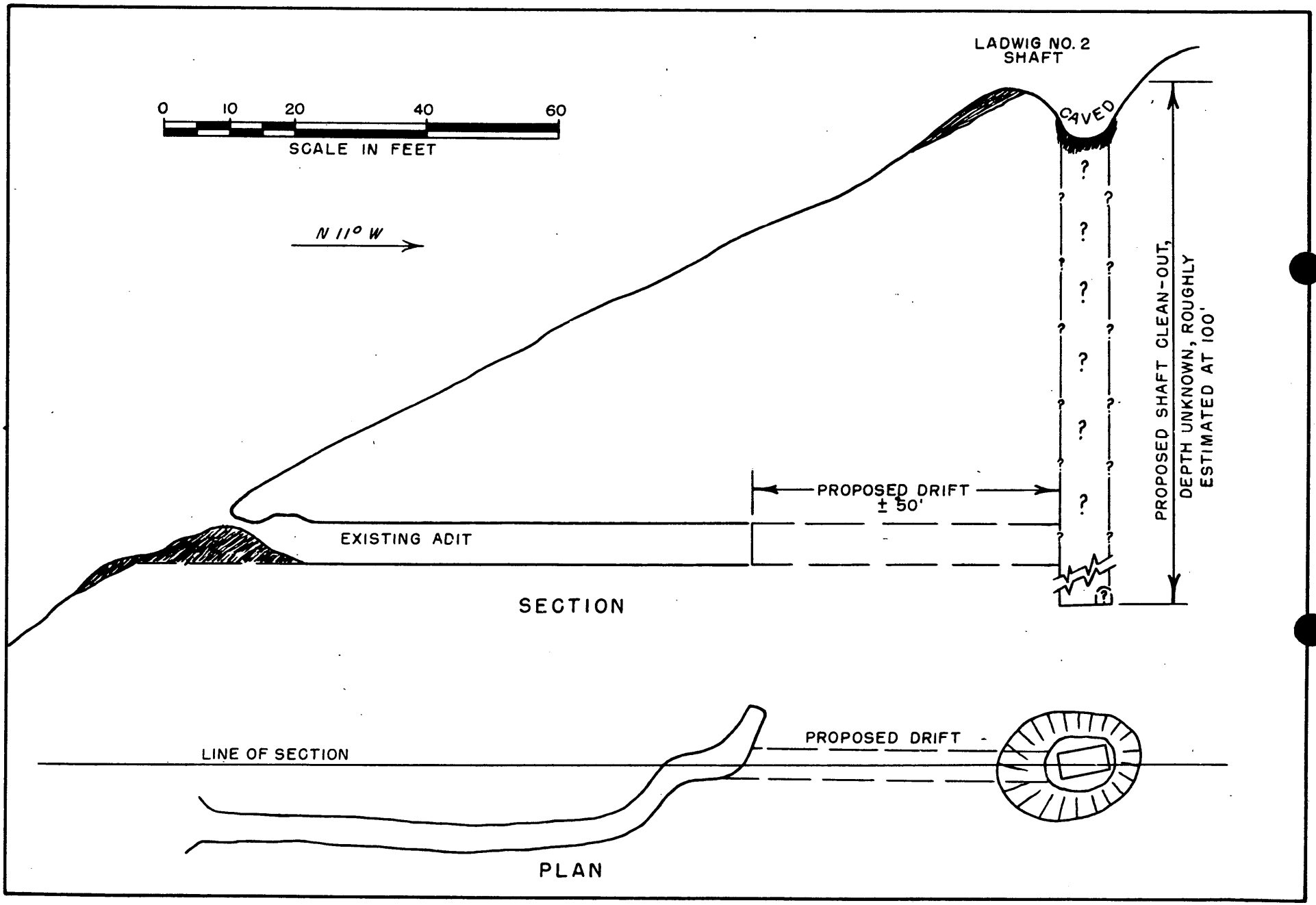


FIGURE 4 - PROPOSED EXPLORATION, GEORGE B. FRIDEN LEASE, JEFFERSON COUNTY, COLO. (DMEA 3527)

	Per Week	Cost Per Foot
Pipe (2-inch compressed air, plus fittings for hoist and ventilation 800 ft. at $35/100 feet		$ 2.80
Other (fuel, lubricants, etc.) at $170.00 per month		2.12
Small tolls (picks, shovels, axes, saws, wrenches, etc., at $100.00)		1.00
	Total	5.92

Operating Equipment

Rental		
1 --160 cfm. portable air compressor at $220/mo.		2.20
1 - compressed air hoist, complete at $80/mo.		.80
Hoisting bucket and dump plate at $50/mo.		.50
	Total	$ 3.50

New Buildings

1 - Tool and maintenance shack at $200.00	2.00
Head works for hoisting $100	1.00

Miscellaneous

Repairs to equipment		$ 1.00
Sampling and analyses - $75.00		.75
Payroll taxes		
F.I.C.A. ($14.30 x 1.5 percent)		.22
Colo. Compensation Ins. ($14.30 x $2.95 per $100.00)		.42
Bookkeeping, 1 month at $25.00		.31
	Total	$ 2.70

Contingencies

Service truck or Jeep rental at $100.00 per month	1.00
Total cost to rehabilitate the Ludwig No. 2 shaft per foot	$ 34.42

Total cost to rehabilitate the shaft, assuming it is 100 feet deep is-- $ 3,442.00

Time to complete--about 6 weeks

Estimated cost of rehabilitating the Ledvig No. 2 adit
operations 6 days weekly, (estimated time required, 1 week)

	Per week		Cost Per Foot
Labor and Supervision			
1 foreman-miner at $2.00 per hour, plus overtime	$104.00	$1.16	
2 miners at $1.75 per hour, plus overtime	182.00	2.02	
Labor cost per foot--average			3.18
F.I.C.A. - 2½ percent			.05
Colorado Compensation ins.($2.95 per $100.)			.09
500 feet of 2 inch air line at $35/100 feet			.35
90 feet of track at $1.00 per foot			1.00
Timber estimated at $50.00			.56
Average cost per foot to rehabilitate the adit			5.23
Minus salvage reclaim (pipe and track)			- .68
Average			$ 4.55
Cost of rehabilitating Ledvig No. 2 adit			$ 409.50

Estimated cost of drifting at Ledvig No. 2 adit
Estimated length, 50 feet, operations 6 days weekly.
Advance 20 feet per week (estimated time required 2-1/2 to 3 weeks)

	Per Week		Cost Per Foot
Labor and Supervision			
1 foreman-miner at $2.00 per hour, including overtime (6 days weekly)	$104.00	$5.20	
2 miners at $1.75 per hour (6 days weekly) including overtime	182.00	9.10	
Labor cost per foot--20 feet per week			$ 14.30
Operating Materials and Supplies			
Timber (studs, lagging, wedges as required) Total for project ($100)			2.00
Explosives (dynamite, caps, fuses, etc.)			3.00
Pipe (air, water) at $0.50 per foot			.50
Track			1.00
Other (fuel, lubricants, freight, bits, steel, small tools, carbide)			3.00
Total			$ 9.50
Minus salvage reclaim			- 1.25
			$ 8.25

	Cost Per Foot
Operating Equipment	
Rental only	
1-105-150 c.f.m. portable air compressor at $150.00 per month	$ 3.00
1-Cepco Pacific Ltd., jackleg rock drill complete with air and water hoses, pressure tank, and small air grinder for drill bits at $100.00 per month	2.00
1-64 cubic foot mine car at $20.00 per month	.40
A service truck or Jeep at $100.00 per month	2.00
Total	$ 7.40
New Buildings, Improvements, etc.	
1-service shanty $100.00	2.00
minus salvage reclaim	- 1.00
	$ 1.00
Miscellaneous	
Repairs to equipment	$ 1.00
Sampling and analyses ($45.00)	.90
Payroll taxes	
F.I.C.A. ($14.30 x 1.5 percent)	.23
Colorado Compensation Ins. ($14.30 x $2.95 per $100.00)	.42
Bookkeeping at $25.00 per month	.50
	$ 3.05
Contingencies	
Included in estimates	
Total	$34.00

Cost of drifting from the face of the Ladwig No. 2 adit to the shaft--$34.00 per foot.
Length - approximately 50 feet

Total cost of drifting 50 feet - $1,700.00

Cleaning out Ladwig No. 2 shaft from the adit level; at 4 feet per day. (estimated time required 4 weeks)

Labor and Supervision	Per Week	
1-foreman-miner at $2.60 per hour, including overtime	$104.00	$ 4.34
2-miners at $1.75 per hour (6 days per week) including overtime	182.00	7.58
		$ 11.92

	Cost Per Foot
Operating Materials and Supplies	
Timber (stulls, lagging, wedges, lattern, sills, etc.)	$ 4.00
Explosives (dynamite, caps, fuse, etc.)	.80
Pipe	.50
Track	None
Other (fuel, lubricants, small tools, carbide, etc.)	2.00
	6.70
Minus salvage reclaim	- .85
	$ 5.85
Operating Equipment	
Rental only	
1--105-130 c.f.m. portable air compressor at $150.00 per month	1.54
1-Cupco Pacific Ltd., jackleg drill complete with air and water hoses, pressure tank and air driven bit grinder at $100.00 per month	1.04
1-24 cubic feet mine car at $20.00 per month	.21
A service truck or Jeep at $100.00 per month	1.04
	$ 3.85
Initial Rehabilitation and Repairs	None
New Buildings, Improvements, etc.	None
Miscellaneous	
Repairs to equipment	1.00
Sampling and analyses ($45.00)	.47
Payroll taxes	
F.I.C.A. ($11.92 x 1.5 percent)	.18
Colorado Compensation Ins. ($11.92 x $2.95 per $100.00)	.35
Bookkeeping at $25.00 per month	.26
	$ 2.26
Contingencies	
Included in estimates	

Total cost per foot to rehabilitate shaft, $24.68

Because the depth of the shaft is little better than a guess, the possibility exists that a raise may be required to the bottom of the Ludwig No. 2 shaft. This raise can be driven for an estimated $5.32 more per foot than the allowance for cleaning out and rehabilitating the Ludwig No. 2 shaft, or for a total of $30.00 per foot.

The program recommended by the examining team was discussed with the applicant on November 12, 1954.

Recapitulation of Costs for Recommended Project

Items	Required Time	Cost Per Foot	Total
Rehabilitate Ladwig No. 2 adit	1-week	$ 4.55	$ 409.50
Drifting from adit to connection with Ladwig No. 2 shaft	2-1/2 to 3 weeks	$4.00	1,700.00
*Cleaning out and rehabilitating the Ladwig No. 2 shaft	4 weeks	$4.68	2,468.00
Totals**	8 weeks		$ 4,577.50
Government participation--75 percent			$ 3,433.13

* If a raise is required for connection, $5.32 per foot should be added to the cost.

** Does not include a raise connection.

CONCLUSIONS

Uranium as pitchblende, uraninite (?) and torbernite have been found in carbonate fault breccia fragments in the dump of the Ladwig No. 2 shaft. Little or no evidence of uranium mineralization was noted in excavations north of and above the shaft, or in a 90-foot adit south of the shaft and about 70 feet below it driven on the same carbonate fault breccia zone.

The presence of a uranium ore body associated with a copper carbonate-sulfide ore body can only be inferred from the dump content at the Ladwig No. 2 shaft. The evidence available in this area indicates that the discovery of a small amount of ore appears no more than fair, however, an examination of the inferred vein, in place,

could change the conclusions entirely.

The applicant estimates that the Ludwig No. 2 shaft is about 100 feet deep from the size of the dump, however, this could be greatly in error if stoping was carried on underground.

Evidence available to the examining team does not justify the applicants elaborate program, however, since this is a comparatively new area and evidence of uranium has been found on the dump, a small amount of work appears justified and an alternate program (fig. 4) has been recommended by the examining team at a cost of approximately $4,577.50; U. S. Government participation at 75 percent will be $3,433.13. Estimated time for completion is about 2 months.

RECOMMENDATIONS

A unit cost short-form contract is recommended to include:

(1) Rehabilitation of the 90-foot Ludwig No. 2 adit for about	$ 409.50
(2) Drifting along the carbonate breccia zone to a connection with the Ludwig No. 2 shaft, for about	1,700.00
(3) Cleaning out and rehabilitating the Ludwig No. 2 shaft for about to expose the inferred uranium-copper vein.	2,468.00

Sampling and analyses are included.

Total cost of the project	$4,577.50
Government participation, 75 percent or	3,433.13

Estimated time to complete is about 2 months.

Because the depth of the shaft is unknown, the possibility exists that a raise may be required to the actual shaft bottom. This could be driven at cost of $5.30 per foot more than the estimated shaft rehabilitation cost.

/43

...erals Administration
...RED

224 New Customhouse
Denver 2, Colorado

December 1, 1954

Mr. George B. Friden
850 Reed Street
Lakewood 15, Colorado

Re: Docket DMEA 3527

Dear Mr. Friden:

Reference is made to your application for Government aid on the E½ of SE¼, Sec. 19, T. 3 S., R. 70 W., Jefferson County, Colorado.

A careful study of your property indicates that your extensive exploration program is not justified by any mineralization manifested at this time. Rehabilitation of a caved shaft of unknown depth is not considered to be exploration. Under these circumstances, your application is denied without prejudice.

It is suggested that should you elect to rehabilitate the Ladwig No. 2 shaft at your own expense and thereby disclose mineralization which you believe would warrant a definite exploration program, we would be pleased to give consideration to a new application for DMEA aid on your property.

Very truly yours,

W. H. King

W. H. King

for E. N. Hansbrman

A. H. Koschmann

DMEA Field Team, Region IV

HMC:dm

cc: Administrator
DMEA
AHKoschmann
WMTraver
ALBrokaw
AEC
Mining Division
Subject
Chron

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

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
DEC 3 1954

224 New Customhouse
Denver 2, Colorado

December 1, 1954

Memorandum

To: Administrator, Defense Minerals Exploration Administration
Attention: 200

From: Field Team, Region IV

Subject: Report of Examination, DMEA Docket 3527 (Uranium)
George B. Friden, E½ of SE¼ Sec. 19, T. 3 S., R. 70 W.,
Jefferson County, Colorado

Enclosed are four copies of the report of examination on the subject docket, a copy of the letter of denial to the applicant, and two copies of Form 3b.

W. H. King

W. H. King

for E. M. Hershman

A. H. Koschmann

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
DEC - 3 1954

Mining Division
Region IV

December 1, 1954

224 New Customhouse
Denver 2, Colorado

Memorandum

To: DMEA Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: Report of Examination, DMEA Docket 3527 (Uranium)
George B. Friden, E½ of SE¼ Sec. 19, T. 3 S., R. 70 W.,
Jefferson County, Colorado.

Enclosed are 11 copies of the engineering report of examination on the subject docket.

The applicant requested $32,450.00 to build an access road, install surface facilities, rehabilitate the Ladwig No. 2 shaft, sink the shaft 70 feet, and drift 70 feet.

The engineer examiner recommends the rehabilitation and extension of the Ladwig No. 2 adit to the shaft or to a point beneath the bottom of the shaft. If the shaft extends to the adit level it will be cleaned out and if the shaft does not extend to that depth, a raise will be driven to connect with the bottom of the shaft.

We do not concur in this recommendation because the rehabilitation of a caved shaft of unknown depth is not considered to be exploration and no definite target is known. We recommend that the application be denied without prejudice.

W. H. King

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Region IV

Building 20, Room 137
Denver Federal Center
Denver 2, Colorado
November 10, 1954

Memorandum

To: Executive Officer, DMEA Field Team, Region IV

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

Subject: DMEA 3527 (Uranium) George B. Friden lease (E1/2 of SE1/4 sec. 19, T. 3 S., R. 70 W.) Jefferson County, Colo.

Enclosed are the original and 10 copies of a "Summary, Conclusions, and Recommendations" by C. M. Harrer, Bureau of Mines and D. R. MacLaren, Geological Survey, and of Harrer's engineering report on the above docket.

Harrer concludes that while the presence of uranium can only be inferred in the Ladwig No. 2 shaft mine workings from ore found on the dump, there is evidence enough to justify a small amount of work. He recommends extending an existing adit after it is rehabilitated, to underneath the shaft. If the shaft extends to the adit level, it will be cleaned out and if it does not extend to that depth, a raise will be driven to connection with the bottom of the shaft from the adit. He suggests a short-form unit cost contract and estimates the cost as $4,377.50 with 2 months required to complete. Costs will be increased in case it is necessary to raise to the shaft.

I approve his recommendations.

The estimated costs are not exact, but are a close enough approximation for the amount and type of work proposed. The program was discussed with Atomic Energy Commission personnel.

The applicant indicated in a conference with the examiners that the modified proposal would be acceptable. It would appear, however, that before a contract is entered into he should be notified that he will be required to subordinate all the property shown as owned by him in his application.

The brochure provided with your memorandum of October 8, 1954, instructing us to make a field examination and submit a suitable report is also returned.

W. M. Traver

W. M. Traver

WMT/dj
enclosures
cc: 10
DMEA 3527 Chron

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Defense Minerals Exploration Administration
Denver Federal Center
Denver 2, Colorado

November 4, 1954

Memorandum

To: DMEA Field Team, Region IV

From: A. H. Koschmann

Subject: DMEA Docket 3527, Ladwig No. 2 Mine, Jefferson County, Colorado

Enclosed are 11 copies of a geologic report by D. R. MacLaren of the U. S. Geological Survey covering the above docket.

Pitchblende is associated with base metal sulfides at several localities where carbonate-breccia reefs intersect bands of hornblende gneiss. The Ladwig No. 2 shaft has apparently been driven on one of these intersections and dump material indicates the presence of pitchblende in the shaft or the workings from it.

MacLaren concludes that the program proposed by the applicant is more extensive than is warranted by the ore potential of the area proposed for exploration. He recommends a reduced program of drifting and raising to explore the zone in which ore may occur.

I concur in this recommendation.

The brochure is also enclosed.

E. N. Hauchman
per A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (12)

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA 3527

The George B. Friden Lease

Jefferson County, Colorado

Uranium

D. R. MacLaren, Geologist
Geological Survey

C. M. Harrer, Mining Engineer
Bureau of Mines

October 29, 1954

DMEA 3527

THE GEORGE B. FRIDEN LEASE
JEFFERSON COUNTY, COLORADO

Summary, Conclusions, and Recommendations

By D. R. MacLaren
Geologist
Geological Survey

C. M. Harrer
Mining Engineer
Bureau of Mines

DMEA 3527

THE GEORGE B. FRIDEN URANIUM LEASE JEFFERSON COUNTY, COLORADO

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

By D. R. MacLaren and C. M. Harrer

George B. Friden of 850 Reed St., Lakewood 15, Colo., has applied for a Defense Minerals Exploration Administration loan of $32,450.00 to explore for uranium at the old Ladwig No. 2 prospect which he has under 10 year lease.

The property to be explored is in the E1/2, SE1/4 sec. 19, T 3 S., R 70 W., Jefferson County, Colo., and was investigated in the field by a Region IV, Defense Minerals Exploration Administration examining team, October 21, 1954.

Interlayered belts of gneiss and schist of the Idaho Springs formation (pre-Cambrian), striking N. 75° to 80° E., are cut by northerly to northwesterly trending fault zones filled by carbonate breccia. Pitchblende associated with base metal sulfides has been found at 6 localities within a belt of hornblende gneiss in or along the walls of the breccia zones.

At the Ladwig No. 2 shaft uranium and associated copper minerals have been found in the dump, indicating the existence of a vein containing appreciable amounts of these minerals in the caved portion of the shaft. It is concluded that the evidence available in this area indicates that the discovery of a small amount of uranium ore appears no more than fair, and does not justify the applicants extensive exploration program. However, exposure and examination of

the indicated vein could change this conclusion. Therefore, although the work can be considered more in the nature of prospecting than exploration a modified exploration program, including rehabilitation and extension of an existing 90-foot adit to the Ladwig No. 2 shaft and cleaning out the shaft from the adit at an estimated cost of $4,577.50, which could be completed in 2 months, is recommended; Government participation at 75 percent would be $3,433.13.

Because the depth of the shaft is unknown, the possibility exists that a raise may be required from the adit to the actual shaft bottom. This could be driven at a cost of $5.32 per foot more than the estimated shaft rehabilitation cost, or $30.00 per foot. A short-form unit cost contract is suggested.

The program recommended by the examining team was discussed with the applicant on November 12, 1954.

LADWIG NO. 2 MINE

JEFFERSON COUNTY, COLORADO

DMEA DOCKET 3527

Geologic Report

By D. R. MacLaren
U. S. Geological Survey

LADWIG NO. 2 MINE
JEFFERSON COUNTY, COLORADO

INTRODUCTION

George B. Friden of Lakewood, Colorado, has applied to the Defense Minerals Exploration Administration for assistance to explore for uranium in the Ladwig No. 2 mine, Tucker Gulch, Jefferson County, Colorado. The applicant proposes to construct about one mile of access road, to install surface facilities, to reopen and rehabilitate a caved shaft said to be 100 feet deep, to drill 1,800 feet of holes, 1,000 feet by percussion drill and 800 feet by diamond drill, to deepen the shaft 70 feet, and to drift a total of 70 feet from the shaft. The applicant estimates that the total cost of this proposal will be $32,450.00 of which the Government's share will be 75% or $24,337.50.

The applicant's property comprising the E½ of the SE 1/4, sec. 19, T. 3 S., R. 70 W., 6th P.M., is about three and one-half miles northwest of Golden, Colorado. State Highway 58 passes through the southern end of the property, about 700 feet south of the proposed site of operation, making the property easily accessible throughout the year.

An examination was made October 15, 1954, in the company of E. P. Beroni of the U. S. Geological Survey. Mr. Beroni is a co-author with J. W. Adams and A. H. Gude 3rd, of Geological Survey Circular 320, Uranium Occurrences in the Golden Gate Canyon and Ralston Creek areas, Jefferson County, Colorado (1953), and his knowledge of the area was very helpful. The applicant was not able to be present for the first examination, and a second examination was made October 21, 1954, in the

company of C. M. Harrer of the U. S. Bureau of Mines and George B. Friden, applicant. As a supplement to the field examination, the geology of the area was discussed with J. W. Adams, D. M. Sheridan, and C. H. Maxwell of the U. S. Geological Survey. Mr. Sheridan and Mr. Maxwell are currently engaged in mapping the geology of the area. The problem was further discussed with Ray Durzey and Roger Malan, geologists for the Denver Exploration Branch of the Atomic Energy Commission, who have done considerable work on the geology of the area.

It is concluded from all the available information that the chance of making a significant discovery is, at best, only fair and that the extensive program proposed by the applicant is not warranted. However, the evidence, in the caved portion of the shaft, of a sulfide vein containing appreciable amounts of uranium associated with copper minerals indicate many fragments on the dump. An examination of this vein in place could alter this conclusion entirely. Therefore a reduced program, which may actually be more in the nature of prospecting than exploration, estimated by the Bureau of Mines to cost $4,577.50 (Government's share 75% or $3,433.13) is recommended. The Atomic Energy Commission representatives agree with these conclusions and recommendations.

GEOLOGY

The geology of the area is described by J. W. Adams, A. J. Gude, 3rd, and E. P. Beroni in Geological Survey Circular 320 (1953). The rocks are interlayered belts of schist and gneiss of the Idaho Springs formation of pre-Cambrian age. The belts trend N. 75° to 80° E. and dip to the north. They are cut by a series of northerly-to northwesterly-trending brecciated, carbonate-bearing fault zones. Pitchblende, associated with

base metal sulfides, has been found at six localities within a belt of hornblende gneiss, 150 to 200 feet wide. Each locality is within or along the walls of an intersecting fault zone. Adams reports the assay results of 30 samples taken in this belt. The highest assay is 6.89% U_3O_8 over a width of .3 feet. This sample was taken from an inclined shaft about 1,700 feet west of the Ladwig No. 2 mine. Nine other assays range in grade from .13% U_3O_8 to 1.6% U_3O_8, while the remaining twenty are all less than .10% U_3O_8.

At the Ladwig No. 2 mine (figure 3) a slightly radioactive breccia zone, one to three feet wide, striking N. 10° W. and dipping 80° E. to vertically, cuts across a 175-foot wide belt of hornblende gneiss that strikes N. 75° to 80° E. and dips 70° to 80° N. An old shaft, sunk on the breccia, is said to be 100 feet deep but is plugged about 15 feet below the collar. The accuracy of the estimated depth is questionable as the estimate is based upon the statement of an "old timer" who claims that as a small boy, his father took him down the shaft. The present size of the dump is not too good a criterion as its original size might have been augmented by any drifting from the shaft, and there is no way of estimating the extent to which the original size may have been decreased by exposure during the years. The breccia exposed in the upper portion of the shaft is composed of fragments of carbonate rock and altered gneiss. Both the breccia and the gneiss, for a distance of one to five feet from the contact, are oxidized and heavily iron-stained. On the dump about the shaft are pieces of limonite-stained breccia and fragments of copper-stained, vein-like material that contain pitchblende and some torbernite. Neither uranium nor copper minerals were found in

the shaft by the examiners although Beroni states that he had found one small streak containing pitchblende in 1953. Measured with a geiger counter, radioactivity varied from .006 to .008 MR/hr on the walls of the shaft, and from .02 to .04 MR/hr on the upper portion of the dump. A selected piece of vein-like, copper-stained material taken from the dump showed radiation up to .15 MR/hr. Atomic Energy Commission geologists reported radiation of as much as .5 MR/hr in a zone lower down the slope of the dump. Adams (1953) collected a grab sample of carbonate breccia from the dump that contained pitchblende and copper minerals and assayed .35% U_3O_8, 8.25% Cu, .10% Pb, .10% Zn, and .2% $CaCO_3$.

About 45 feet north of the shaft and 19 feet above the collar, an adit has been driven about 11 feet along the breccia. No uranium or copper minerals were found in the adit and radioactivity was nit to very weak. However, at the adit portal radiation up to .01 MR/hr was recorded.

About 135 feet south of the shaft and 72 feet below the elevation of the collar, an adit about 92 feet long has been driven parallel to and on the breccia. No uranium or copper minerals were found in this adit, and radioactivity was nil in the hornblende gneiss to very weak in the carbonate breccia.

About 100 feet east of the shaft a recent trench is on a northerly trending shear zone. Vein-like copper-stained streaks at the south end of the trench gave radiations of .01 to .02 MR/hr and the trench as a whole gave only .006 MR/hr. Although no breccia was exposed in the trench, there may be another such zone a few feet to the east. Adams (1953) says of an old shallow cut about 20 feet to the north, "--- radioactive samples, probably derived from another breccia zone, were found in the debris from the lower of two shallow cuts about 100 feet

east of the shaft. Copper minerals, notably carbonates, are conspicuous on the dump where the uranium minerals are found.---".

CONCLUSIONS AND RECOMMENDATIONS

From the information available at this time it is concluded that:

1. Pitchblende associated with basic sulfide minerals has been found at six localities along the intersections of carbonate-breccia fault zones with a belt of hornblende gneiss

2. That a shaft of indeterminate depth is on one such intersection at the Ladwig No. 2 mine

3. That material on the dump about the shaft indicates the possible existence in the shaft of a vein containing appreciable amounts of uranium and copper minerals

4. That the chance of making a significant discovery of uranium ore is not sufficiently indicated to justify the proposed program, and

5. That exposure and examination of the indicated vein might entirely change these conclusions.

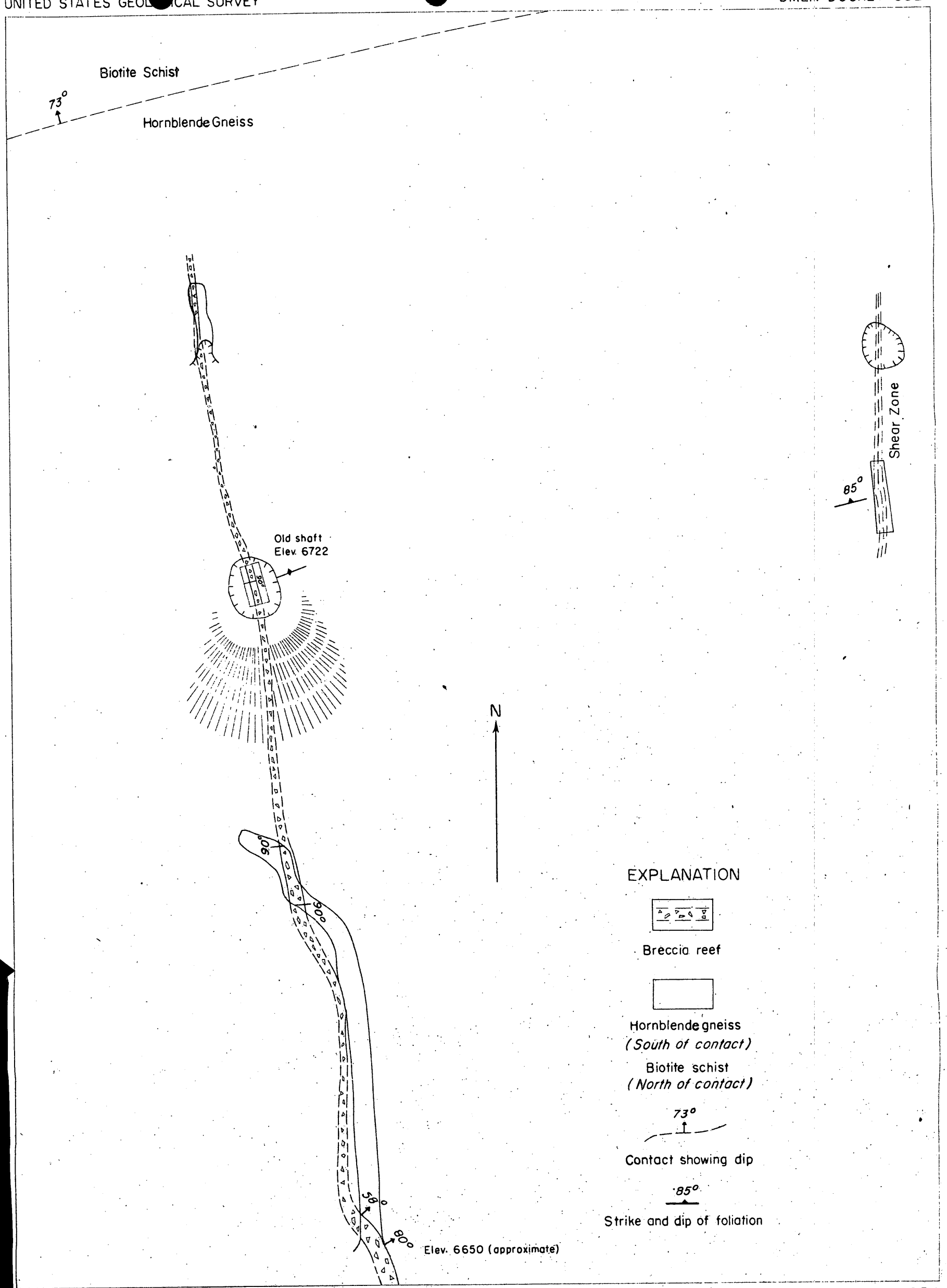
It is recommended that the program submitted by the applicant be denied. However, although it might be more in the nature of prospecting than exploration, a modified program to permit examination of the indicated uranium bearing vein is recommended for approval.

MODIFIED PROGRAM

The existing tunnel about 72 feet below the collar of the shaft (figure 4) should be extended about 50 feet along the breccia to connect with the shaft, and the shaft should then be made accessible from this drift. In event the shaft does not extend to the drift level, raising

to the bottom of the shaft should be allowed. Upon completion of this work a reexamination and reappraisal should be made to determine whether or not approval of the original application might then be justified. The Bureau of Mines estimates that the cost of this recommended program will be $4,577.50 (Govenmment's share 75% or $3,433.13).

As the portal of the lower tunnel is only about 600 feet from State Highway 58 which has a cleared fringe wide enough to house a portable compressor off the road, the proposed work can be done without the necessity of any access road or surface installation other than a shed for a compressor and the laying of a pipeline from the highway to the portal of the tunnel.



Geology by D. A. MacLaren, October, 1954

FIGURE 3.- SKETCH SHOWING GEOLOGY AND KNOWN WORKINGS, LADWIG NO. 2 MINE, GEORGE B. FRIDEN, OPERATOR, JEFFERSON COUNTY, COLORADO

20 0 20 Feet

DMEA 3527

THE GEORGE B. FRIDEN LEASE
JEFFERSON COUNTY, COLO.

Engineering Report

By C. M. Harrer
Mining Engineer
Bureau of Mines

DMEA 3527

THE GEORGE B. FRIDEN LEASE
JEFFERSON COUNTY, COLORADO

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* See figure with geologic report.

DMEA 3527

THE GEORGE B. FRIDEN LEASE
JEFFERSON COUNTY, COLO.

ENGINEERING REPORT

By C. M. Harrer

INTRODUCTION

George B. Friden, of 850 Reed Street, Lakewood 15, Colo., has applied for a Defense Minerals Exploration Administration loan of $32,450.00 to explore for uranium at the old Ladwig No. 2 mine which is included within his lease.

The property has been visited by members of the Atomic Energy Commission during 1954 and was studied by the Geological Survey during 1951-52. 1/

The property was examined for the Region IV, Defense Minerals Exploration Administration by the writer, accompanied by Don R. MacLaren of the Geological Survey, and George B. Friden, the applicant, on October 21, 1954.

ACKNOWLEDGMENTS

Jack W. Adams, geologist for the Geological Survey, and R. C. Derzay of the Atomic Energy Commission made the results of prior investigations by their agencies, available to the examining team. George B. Friden, loan applicant, accompanied the examining team and cooperated fully by providing all information at his disposal.

1/ Adams, J. W., Gude, A. J., Beroni, E. P. Uranium Occurrences in the Golden Gate Canyon and Ralston Creek Areas, Jefferson County, Colorado: U. S. Geol. Survey Circular 320.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The George B. Friden lease includes the old Ladwig No. 2 copper prospect in sec's. 19 and 20, T. 3 S., R. 70 W., Jefferson County, Colo., (fig. 1 and 2) at altitudes ranging between 6,500 and 7,000 feet above sea-level. The property is about 3 miles west of Golden on Colorado State Highway 58. The terrain is steep and rugged. Supplies are readily obtainable from Golden and Denver.

HISTORY AND PRODUCTION

The property is owned by Lyman C. Ladwig. There is no official record of either copper or uranium production.

OWNERSHIP AND EXTENT

George B. Friden of 850 Reed St., Lakewood 15, Colo., holds a mineral lease on 600 acres of land (fig. 2) in sec's. 19 and 20, T. 3 S., R. 70 W., Jefferson County, Colo. The lease includes all minerals except oil and gas and particularly mentions uranium. The lease is the culmination of a prior agreement and is in effect from September 15, 1954 to September 15, 1964, and as long thereafter as minerals are found in paying quantities and are continually mined. This lease cannot be assigned or subleased without written consent of the owner, Lyman C. Ladwig. It includes the SW1/4 of the E1/2 of the SE1/4; and the SE1/4 of the NE1/4 of sec. 19; all of the W1/2 of sec. 20, except the SE1/4 of the NW1/4 thereof, (fig. 2).

George B. Friden proposes to subordinate only the E1/2 of the SE1/4 of sec. 19, T. 3 S., R. 70 W. This 80 acres includes the old Ladwig No. 2 copper prospect, which he desires to explore.

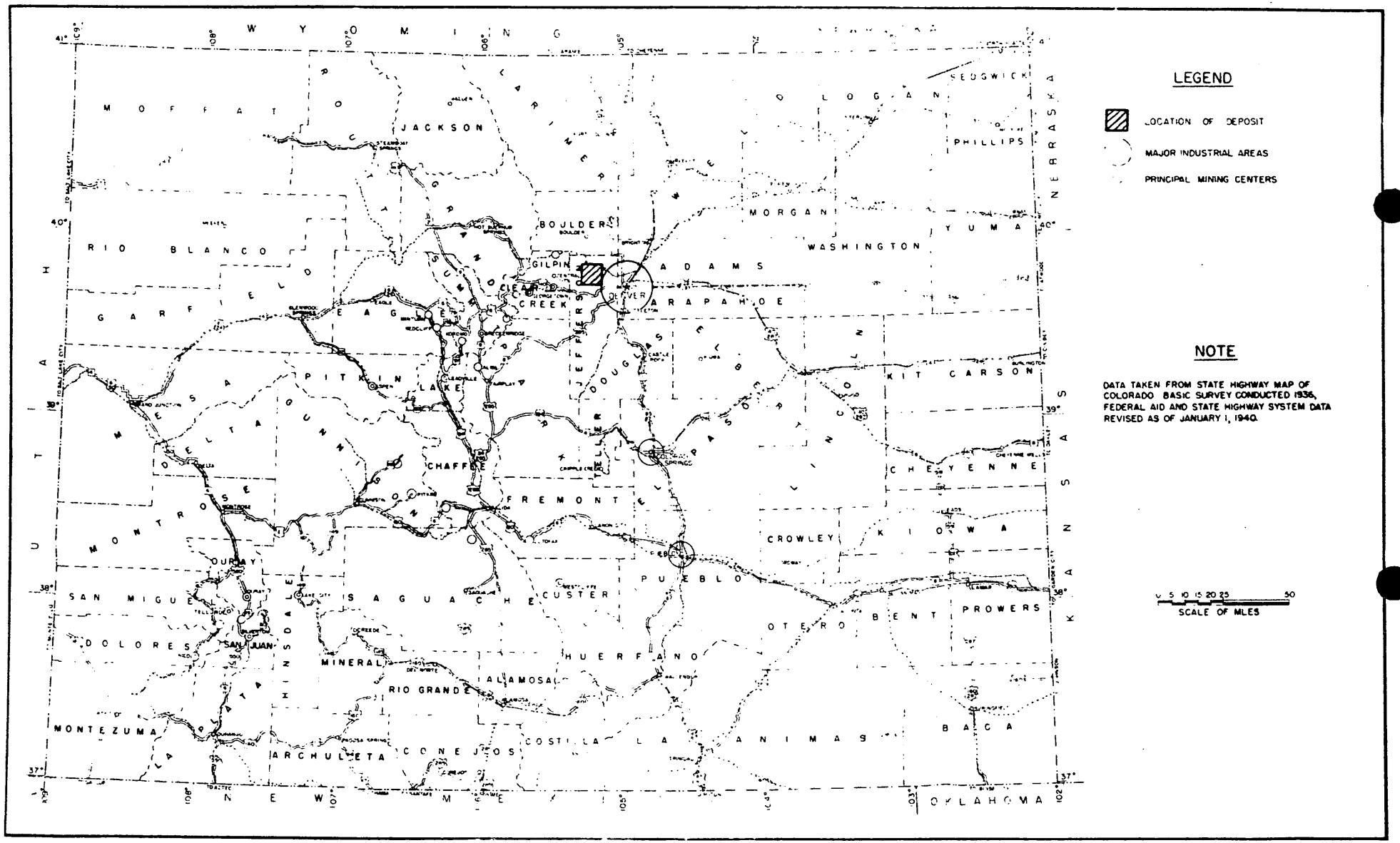


FIGURE 1 - LOCATION MAP, GEORGE B. FRIDEN LEASE, JEFFERSON COUNTY, COLO. (DMEA 3527)

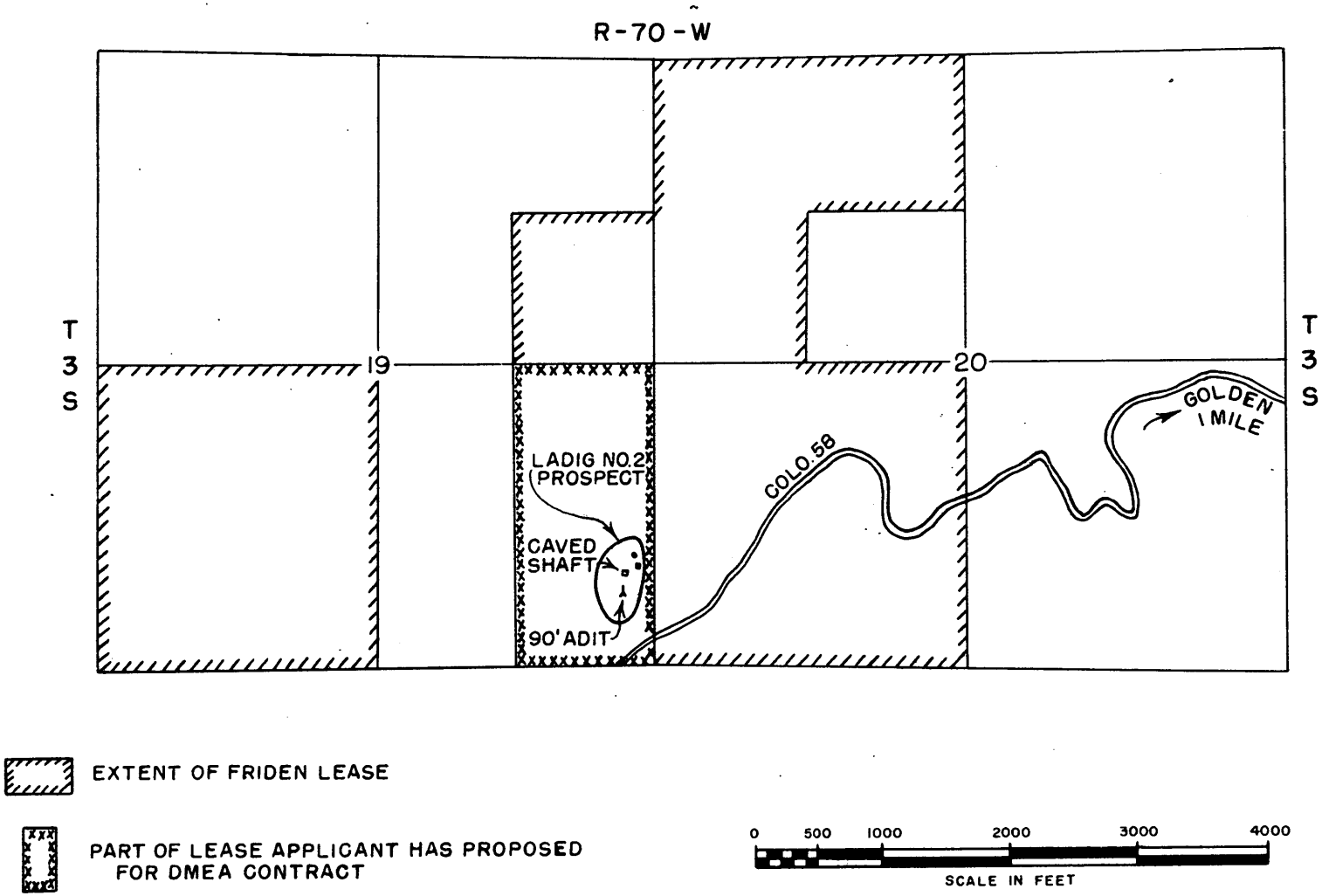


FIGURE 2 - PROPERTY MAP, SHOWING LOCATION OF PROPOSED EXPLORATION, GEORGE B. FRIDEN LEASE, JEFFERSON COUNTY, COLO. (DMEA 3527)

DESCRIPTION OF THE DEPOSIT

The Ladwig No. 2 prospect is one of several copper and uranium occurrences within an area of pre-Cambrian gneisses and schists along the flanks of the Front Range; about 3 miles west of Golden, Colo. Uranium occurs as the minerals pitchblende and uraninite (?). A grab sample 2/ from an old dump made up of carbonate breccia, with pitchblende and copper minerals assayed 0.30 percent uranium, 8.25 percent copper, 0.10 percent lead, 0.10 percent zinc, and 0.2 percent calcium carbonate per ton.

The uranium mineralization appears to be limited to a zone of fine grained hornblende gneiss about 150 to 200 feet wide, which has been cut by a carbonate bearing breccia fault zone 1 to 6 feet wide.

No uranium minerals were found in place, but specimens collected from the shaft dump are reported to contain pitchblende and torbernite in limonite stained breccia. Copper minerals, notably carbonates, can be seen on the dump of the Ladwig No. 2 shaft. This shaft is caved and wholly inaccessible. It has been variously estimated as up to 100 feet deep. This estimate is little more than a guess, since any rock from underground excavations, other than from the shaft itself would make the estimated depth unreliable.

MINEABLE ORE RESERVES

No data is available on which to base an estimate of any type of ore reserves.

2/ Work cited in footnote 1/

PRESENT STATUS

Exploration and Development

The Ladwig No. 2 prospect has been explored (fig. 4) by a 93-foot adit which is accessible although its portal is partially caved. The Ladwig No. 2 shaft, estimated at 4 x 8-foot cross-section is caved to within 10 feet of the collar. Its depth is reported by the applicant as about 100 feet, however, this is little more than a guess. Several shallow caved pits are located in the vicinity. The property has long been dormant and no data is available on early history.

Mining and Milling Equipment and Other Facilities

No mining, milling or other equipment of any kind are available on the property.

APPLICANTS PROJECT PROPOSALS, WITH COSTS

The applicant proposes to explore further the uranium indications on the Ladwig No. 2 prospect. The prospect is presently accessible by State Highway 58 to within about 400 feet from which point access is by steep trail only.

He plans first to make the prospect accessible with approximately one mile of road suitable to truck in equipment, supplies and men to carry on an exploration program. Cost of the road includes the following items and costs:

Bulldozer operation for 150 hours at $16.00 per hour	$ 2,400.00
Culverts	600.00
Rock removal	600.00
Road maintenance for one year (Bulldozer 50 hours at $12.00 per hour)	600.00
Total	$ 4,200.00

Secondly, upon completion of the road, he proposes to purchase and install surface facilities as follows:

A 15 x 30-foot building at $4.50 per square foot	$2,025.00
Heating facilities and seasons fuel	250.00
Fuel tanks	75.00
Workbench and bins	150.00
Hoist, bucket and cable	2,500.00
Head frame, foundation, installation	2,100.00
Small hand tools	250.00
Miscellaneous and haulage	1,100.00
Total	$8,450.00

Thirdly, he proposes to rehabilitate the Ladwig No. 2 shaft, including cleaning out and timbering where necessary, at $40.00 per foot. He estimates a depth of 100 feet for $4,000.00 and includes the taking, transportation and assaying of 20 samples at $27.50, for $550.00 , total $4,550.00.

Fourthly, if examination of the shaft proves encouraging, he proposes percussion and diamond drilling as follows:

Drill site preparation (Bulldozer 50 hours at $15.00)	$ 750.00
Up to 1,000 feet of percussion drilling for probing, at $1.50	1,500.00
Up to 800 feet of core drilling at $4.50 per foot	3,600.00
Taking, transporting and assaying 20 samples at $27.50	550.00
Total	$6,400.00

Fifthly, if drilling proves encouraging, he proposes to sink

the shaft for about 70 feet at $100.00 per foot;	$7,000.00
and to drift about 70 feet at $40.00 per foot;	2,800.00
and take, transport, and assay 20 samples at $27.50 each	550.00
Total	$10,350.00

Total cost of the project, in all its stages was estimated at $33,950.00. A salvage value of $1,500.00 would reduce the cost to $32,450.00.

Work would be completed within one year.

EXAMINING TEAM'S PROPOSAL

Since the presence of uranium has been established by the examination of dump material at the Ladwig No. 2 shaft, evaluation of this and similar deposits would be facilitated by making the Ladwig No. 2 shaft accessible for examination. This can be accomplished by removing the caved material in the shaft from the top down at a cost estimated at $3,442 or by entering and rehabilitating, an existing 90-foot adit on the same geologic structure and about 70 feet below the shaft collar, extending the adit about 50 feet from its present face to make a connection with the shaft and cleaning out the shaft from the adit level (fig. 4) for an approximate cost of $4,578. The latter is recommended because the drift would explore the geologic structure, in depth, to the shaft and also make the shaft more readily accessible. Furthermore, if the shaft does not expose the vein sufficiently for its evaluation, sinking it to the adit level at a cost of about $100 per foot would be more costly than raising from the end of the extended adit at an estimated cost of $30.00 per foot. Cost data for the proposals are as follows:

Estimated Cost of rehabilitating the Ladwig No. 2 shaft from the collar to an estimated depth of 100 feet, (assuming 20 feet of advance per 6 day week) which includes delays and collar preparation.

	Per Week	Cost Per Foot	
Labor and Supervision			
1 foreman-miner at $2.00 per hour; plus overtime	$ 104.00	$5.20	
2 miners at $1.75 per hour; plus overtime	182.00	9.10	
Labor cost per foot - 20 feet per week			$14.30
Operating Materials and Supplies			
Timber (stulls, lagging, wedges, nails, where required, and ladders)			4.00

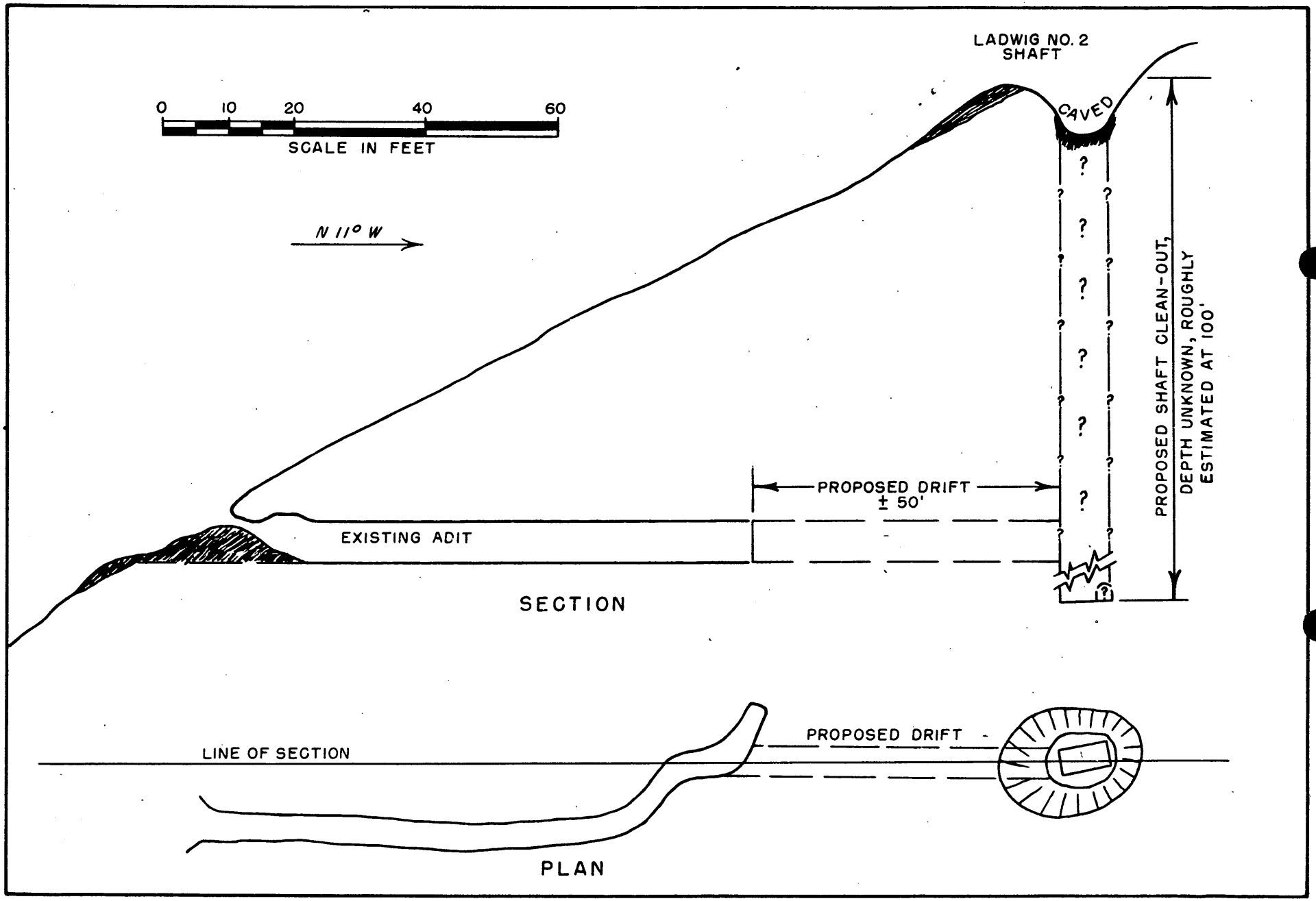


FIGURE 4 - PROPOSED EXPLORATION, GEORGE B. FRIDEN LEASE, JEFFERSON COUNTY, COLO. (DMEA 3527)

	Per Week	Cost Per Foot
Pipe (2-inch compressed air, plus fittings for hoist and ventilation 800 ft. at $35/100 feet		$ 2.80
Other (fuel, lubricants, etc.) at $170.00 per month		2.12
Small tolls (picks, shovels, axes, saws, wrenches, etc., at $100.00)		1.00
	Total	9.92
Operating Equipment		
Rental		
1 --160 cfm. portable air compressor at $220/mo.		2.20
1 - compressed air hoist, complete at $80/mo.		.80
Hoisting bucket and dump plate at $50/mo.		.50
	Total	$ 3.50
New Buildings		
1 - Tool and maintenance shack at $200.00		2.00
Head works for hoisting $100		1.00
Miscellaneous		
Repairs to equipment		$ 1.00
Sampling and analyses - $75.00		.75
Payroll taxes		
F.I.C.A. ($14.30 x 1.5 percent)		.22
Colo. Compensation Ins. ($14.30 x $2.95 for $100.00)		.42
Bookkeeping, 1 month at $25.00		.31
	Total	$ 2.70
Contingencies		
Service truck or Jeep rental at $100.00 per month		1.00
Total cost to rehabilitate the Ladwig No. 2 shaft per foot		$ 34.42

Total cost to rehabilitate the shaft, assuming it is 100 feet deep is-- $ 3,442.00

Time to complete--about 6 weeks

Estimated cost of rehabilitating the Ladwig No. 2 adit
operations 6 days weekly, (estimated time required, 1 week)

	Per Week		Cost Per Foot
Labor and Supervision			
1 foreman-miner at $2.00 per hours; plus overtime	$104.00	$1.16	
2 miners at $1.75 per hours, plus overtime	182.00	2.02	
Labor cost per foot--average			3.18
F.I.C.A. - 1.5 percent			.05
Colorado Compensation ins.($2.95 per $100.)			.09
500 feet of 2 inch air line at $35/100 feet			.35
90 feet of track at $1.00 per foot			1.00
Timber estimated at $50.00			.56
Average cost per foot to rehabilitate the adit			5.23
Minus salvage reclaim (pipe and track)			- .68
Average			$ 4.55
Cost of rehabilitating Ladwig No. 2 adit			$ 409.50

Estimated cost of drifting at Ladwig No. 2 adit
Estimated length, 50 feet, operations 6 days weekly.
Advance 20 feet per week (estimated time required 2-1/2 to 3 weeks)

	Per Week		Cost Per Foot
Labor and Supervision			
1 foreman-miner at $2.00 per hour, including overtime (6 days weekly)	$104.00	$5.20	
2 miners at $1.75 per hour (6 days weekly) including overtime	182.00	9.10	
Labor cost per foot--20 feet per week			$ 14.30
Operating Materials and Supplies			
Timber (stulls, lagging, wedges as required) Total for project ($100)			2.00
Explosives (dynamite, caps, fuses, etc.)			3.00
Pipe (air, water) at $0.50 per foot			.50
Track			1.00
Other (fuel, lubricants, freight, bits, steel, small tools, carbide)			3.00
Total			$ 9.50
Minus salvage reclaim			- 1.25
			$ 8.25

	Cost Per Foot
Operating Equipment	
Rental only	
1-105-150 c.f.m. portable air compressor at $150.00 per month	$ 3.00
1-Copco Pacific Ltd., jackleg rock drill complete with air and water hoses, pressure tank, and small air grinder for drill bits at $100.00 per month	2.00
1-24 cubic foot mine car at $20.00 per month	.40
A service truck or Jeep at $100.00 per month	2.00
Total	$ 7.40
New Buildings, Improvements, etc.	
1-service shanty $100.00	2.00
minus salvage reclaim	- 1.00
	$ 1.00
Miscellaneous	
Repairs to equipment	$ 1.00
Sampling and analyses ($45.00)	.90
Payroll taxes	
F.I.C.A. ($14.30 x 1.5 percent)	.23
Colorado Compensation Ins. ($14.30 x $2.95 per $100.00)	.42
Bookkeeping at $25.00 per month	.50
	$ 3.05
Contingencies	
included in estimates	
Total	$34.00

Cost of drifting from the face of the Ladwig No. 2 adit to the shaft--$34.00 per foot.
Length - approximately 50 feet

Total cost of drifting 50 feet - $1,700.00

Cleaning out Ladwig No. 2 shaft from the adit level; at 4 feet per day. (estimated time required 4 weeks)

Labor and Supervision	Per Week	
1-foreman-miner at $2.00 per hour, including overtime	$104.00	$ 4.34
2-miners at $1.75 per hour (6 days per week) including overtime	182.00	7.58
		$ 11.92

		Cost Per Foot
Operating Materials and Supplies		
Timber (stulls, lagging, wedges, ladders, nails, etc.)	$	4.00
Explosives (dynamite, caps, fuse, etc.)		.20
Pipe		.50
Track		None
Other (fuel, lubricants, small tools, carbide, etc.)		2.00
		6.70
Minus salvage reclaim	-	.25
	$	6.65
Operating Equipment		
Rental only		
1--105-150 c.f.m. portable air compressor at $150.00 per month		1.56
1-Capco Pacific Ltd., jackleg drill complete with air and water hoses, pressure tank and air driven bit grinder at $100.00 per month		1.04
1-24 cubic foot mine car at $20.00 per month		.21
A service truck or Jeep at $100.00 per month		1.04
	$	3.85
Initial Rehabilitation and Repairs		None
New Buildings, Improvements, etc.		None
Miscellaneous		
Repairs to equipment		1.00
Sampling and analyses ($45.00)		.47
Payroll taxes		
F.I.C.A. ($11.92 x 1.5 percent)		.18
Colorado Compensation Ins. ($11.92 x $2.95 per $100.00)		.35
Bookkeeping at $25.00 per month		.26
	$	2.26

Contingencies

Included in estimates

Total cost per foot to rehabilitate shaft, $24.68

Because the depth of the shaft is little better than a guess, the possibility exists that a raise may be required to the bottom of the Ladwig No. 2 shaft. This raise can be driven for an estimated $5.32 more per foot than the allowance for cleaning out and rehabilitating the Ladwig No. 2 shaft, or for a total of $30.00 per foot.

The program recommended by the examining team was discussed with the applicant on November 12, 1954.

Recapitulation of Costs for Recommended Project

Items	Required Time	Cost Per Foot	Total
Rehabilitate Ladwig No. 2 adit	1-week	$ 4.55	$ 409.50
Drifting from adit to connection with Ladwig No. 2 shaft	2-1/2 to 3 weeks	34.00	1,700.00
*Cleaning out and rehabilitating the Ladwig No. 2 shaft	4 weeks	24.68	2,468.00
Totals**	8 weeks		$ 4,577.50
Government participation--75 percent			$ 3,433.13

* If a raise is required for connection, $5.32 per foot should be added to the cost.

** Does not include a raise connection.

CONCLUSIONS

Uranium as pitchblende, uraninite (?) and torbernite have been found in carbonate fault breccia fragments in the dump of the Ladwig No. 2 shaft. Little or no evidence of uranium mineralization was noted in excavations north of and above the shaft, or in a 90-foot adit south of the shaft and about 70 feet below it driven on the same carbonate fault breccia zone.

The presence of a uranium ore body associated with a copper carbonate-sulfide ore body can only be inferred from the dump content at the Ladwig No. 2 shaft. The evidence available in this area indicates that the discovery of a small amount of ore appears no more than fair, however, an examination of the inferred vein, in place,

could change the conclusions entirely.

The applicant estimates that the Ladwig No. 2 shaft is about 100 feet deep from the size of the dump, however, this could be greatly in error if stoping was carried on underground.

Evidence available to the examining team does not justify the applicants elaborate program, however, since this is a comparatively new area and evidence of uranium has been found on the dump, a small amount of work appears justified and an alternate program (fig. 4) has been recommended by the examining team at a cost of approximately $4,577.50; U. S. Government participation at 75 percent will be $3,433.13. Estimated time for completion is about 2 months.

RECOMMENDATIONS

A unit cost short-form contract is recommended to include:

(1)	Rehabilitation of the 90-foot Ladwig No. 2 adit for about	$ 409.50
(2)	Drifting along the carbonate breccia zone to a connection with the Ladwig No. 2 shaft, for about	1,700.00
(3)	Cleaning out and rehabilitating the Ladwig No. 2 shaft for about to expose the inferred uranium-copper vein.	2,468.00
	Sampling and analyses are included.	
	Total cost of the project	$4,577.50
	Government participation, 75 percent or	3,433.13

Estimated time to complete is about 2 months.

Because the depth of the shaft is unknown, the possibility exists that a raise may be required to the actual shaft bottom. This could be driven at cost of $5.32 per foot more than the estimated shaft rehabilitation cost.

/dj

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

224 New Customhouse
Denver 2, Colorado

October 8, 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 applications for Government assistance in exploration work:

Agnew-Smyth	(Uranium)
George B. Friden	(Uranium)

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.

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

Not to be filled in by applicant

Docket No. 3527
Metal or Mineral Uranium
Date Received
Estimated Cost $32,450
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: George B. Pridon
850 Reed St.
Lakewood 15, Colorado
Re 3-9-54

(*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
E 1/2 of the SE 1/4 ~~and SE 1/4 of NE 1/4~~ Sec.19, T3S, R70W (6OA)
Jefferson County, Colo.

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

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

(*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. attached hereto.

(*e*) If you own the land, describe any liens or encumbrances on it

(*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.

(*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.

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

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.

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

(*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. Exhibit D & C

(*c*) The work will start within 30 days and be completed within 12 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.

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:

(*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.

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

(*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.

(*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.

(*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.

(*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.

(*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.

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)? Yes

(*b*) How do you propose to furnish your share of the costs? 1/4

[X] 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 October 3, 1954

George B Snider
(Applicant)

By

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.

October 3, 1954

Addendum to D.M.E.A. Loan Application by George B. Friden.

The proposed uranium exploration site of 80 Acres is located approximately 3 1/2 miles northwest of Golden, Colorado, abuting the county road known as Golden Gate Canyon Road in Tucker Gulch. (The site location is shown on Exhibit "A").

Present and past exploration work for uranium includes the following:

(1) Investigation work and report by U.S.G.S. as described in "Geological Survey Circular 320, (1953) Uranium Occurrences in the Golden Gate Canyon and Ralston Creek Areas, Jefferson County, Colorado."

(2) Radioactive anamoly ground tests in 75' patterns by scintillator equipment. Findings are shown on Exhibit "B".

(3) Geological mapping as shown on Exhibit "B".

(4) Taking of ore samples from ore dump of old copper shaft and prospect pit as shown on Exhibit "B" with excellent assay results of U.S. Bureau of Mines.

(5) The shaft mentioned in (4) above is estimated to be about 100' in depth, but the collar is now caved shut. A tunnel approximately 100' in length has been driven to within approximately forty feet of the shaft.

There has been no past production of uranium from this property. Access to the site is good on all weather roads. Supply of manpower and materials is good and convenient. Distance to rail shipping point is approximately three (3) miles.

The prospect point lays in a Pre Cambrian formation composed of various Gniess and schists. The favorable zones, in which this lies, seem to be at and near breccia faults intersecting hornblende gneiss acting as a host rock.

The work proposed for uranium exploration would be done in stages which may or may not overlap each other. (Please make reference to sketch Exhibit "C"). The work is intended to be done by the applicant under contract.

Stage One:

Road Construction (approx. 1 mile)		$3600.00
Bulldozer 150 hrs.@16.00	$2400.00	
Culverts installed	600.00	
Rock removal	600.00	

Stage Two:

Road Maintenance 1 yr.		
Bulldozer 50 hrs. @ 12.00	600.00	$ 600.00

Stage Three:

Installation of Surface Facilities;		$6950.00
Building approx.15'x30'@$4.50 SF	$2025.00	
Heat Facilities & seasons fuel	250.00	
Fuel Tanks	75.00	
Work bench and bins	150.00	
Winch, bucket and cable	2500.00	
Head Works,foundation,installation	2100.00	
Small Hand Tools	250.00	
Misc. and haulage	1100.00	
Total	$7450.00	
Less Net Salvage	1500.00	

Stage Four:

Rehabilitate shaft including cleanout and timber where necessary 100' @ $40.00	$4000.00
Sampling including Transportation not to exceed 20 ea. @ $7.50	$150.00
Assay not to exceed 20 ea. @ $20.00	$400.00

Stage Five: (if stage 3 warrants)

Prepare drill sites, bulldozer 50 hrs.@ $15.00	$750.00
Up to 1000' of percussion drilling for probe $1.50 per ft.	$1500.00
Up to 800' of core drilling $4.50 per ft.	$3600.00
(The above percussion and core drilling to be done from surface or underground as and if conditions warrant and at locations and to the extent acceptable to the government).	
Sampling including Transportation 20 ea. @$7.50 per sample	$150.00
Assays 20 ea. @ $20.00	$400.00

Stage Six: (if stage 4 or 5 warrants)

Sinking Shaft not exceeding 70' and to the extent acceptable to the Government 70'@$100.00	$7000.00
Drifting at locations and to the extent acceptable to the government 70'@$40.00	$2800.00
Sampling including Transportation not to exceed 20 ea. @ $7.50	$150.00
Assay not to exceed 20 ea. @ $20.00	$400.00
	$32,450.00

Stages 1,2,3,4 must be done once any work has commenced, but stages 5 and/or 6 are dependent on information obtained from prior stages and stage 6 is not dependent on stage 5 being done.

Work would be started within thirty (30) days after approval of an exploration contract and be completed within twelve (12) months of that date.

My experience in mining started in 1937 including mining at Nome, Alaska and at Central City, Colorado as an individual and partnership. Also further experience as an active partner in the Mann Construction Co. in heavy engineering contracts. Only persons of experienced and successful background in this field shall be hired for this project.

The applicant will furnish and accomplish the work set forth in the exploration. It is proposed the Government will reimburse the Operator each month for that portion of each stage or stages of work completed during the preceeding calender month in amount of the Governments' participation, specifically seventy-five percent (75%).

No contingency allowances are made for the contract work and event conditions not possible to anticipate are discovered during stages of the work, the contractor applicant will make proposals for suspension or revision of the proposed work.

MINING LEASE

THIS AGREEMENT OF LEASE, Made and entered into this 14 day of September, A. D. 1954, by and between LYMAN C. LADWIG of the County of Larimer, State of Colorado, hereinafter referred to as LESSOR, and GEORGE D. FRIDEN of the County of Jefferson, State of Colorado, hereinafter referred to as LESSEE, WITNESSETH:

That there has heretofor existed between the parties hereto a certain written agreement dated June 2, 1954, relative to the exploration, prospecting and mining of uranium and other ores, not including oil and gas, and

That the parties hereto are now desirous of consummating the provisions as by said agreement provided and to make and enter into an actual lease of the premises herein described.

NOW, THEREFOR, In consideration of the premises, the rents, royalties, covenants and agreements hereinafter expressed to be paid, kept and performed by the Lessee, the Lessor has leased, let and demised, and by these presents does lease, let and demise unto the lessee the following described mining property and premises, situate in the County of Jefferson, State of Colorado to-wit:

> All of the minerals, EXCEPT oil and gas, in, under and upon the following described lands, together with the right to prospect, mine and drill in or upon the same and to remove such minerals therefrom, with rights of ingress and egress thereon for such purposes, and to erect thereon roads, pipelines, structures and devices for such operation, said lands being, to-wit: The Southwest 1/4; and the East 1/2 of the Southeast 1/4; and the Southeast 1/4 of the Northeast 1/4 of Section 19; all of the West 1/2 of Section 20, except the South east 1/4 of the Northwest 1/4 thereof, Township 3 South, Range 70 West.

To have and to hold the above described premises and privileges for the purpose of mining all ores, EXCEPT gas and oil, from the 15th day of September, 1954 to the 15th day of September 1964, and as much longer thereafter as minerals, other than gas and oil, are found in paying quantities thereon, and are continually mined, unless sooner terminated or forfeited through the violation of any of the covenants and conditions herein contained, with no power to assign this lease or any part thereof or to sublet the whole or any part of said leased premises without the written consent of the Lessor first had and obtained, except that sub-leases or assignments may be made from time to time unto parties financially responsible who shall have themselves conduct mining operations without further subleasing to others, the accountings for which operations Lessee shall be at all times responsible to Lessor.

The Lessee in consideration of the premises has covenanted, contracted and agreed and by these presents does covenant, contract and agree to and with the Lessor, his executors, administrators and assigns as follows:

1. To conduct his prospecting and mining operations in such a manner as not to create hazards to persons or livestock and with a minimum of resulting permanent injury to the surface of said lands, and all such operations at his own risk and expense.

2. To allow Lessor the right at all times to inspect the premises and all ores, assays and samples obtained during and through the exploration or prospecting or mining operations, and to make available unto Lessor all reports obtained therewith for his inspection or reproduction.

3. To comply with Colorado Workman's Compensation Acts and the Colorado Occupational Disease Act, saving Lessor harmless from any liability resulting from injury or illness of himself, his agents or employees.

4. To pay unto Lessor during the period of commercial mining operations the equivalent of the following sums based upon net mill receipts from the uranium ores:

Percentages of Proceeds	Quantity of Uranium Present in Milled Ore
10%	.1 up to 2.5%
15%	commencing at 2.5 up to 5.0%
20%	commencing at 5.0 up to 7.5%
25%	commencing at 7.5 and over

said payments to be due and payable as the ores are paid for upon delivery.

5. To pay unto the Lessor 25% of any bonus that may be allowed under the rules and regulations of the United States Atomic Energy Commission or other federal or state agencies for the discovery of uranium ores, or laws relating thereto, and to pay for current taxes that may be assessed against any improvements placed on such property by Lessee, and the current taxes assessed against the mineral rights during the term thereof, said discovery bonus being as defined by Circular No. 2., Atomic Energy Commission dated April 9, 1948.

6. That should minerals other than uranium be exploited or taken hereunder, Lessor shall receive and Lessee shall pay 12 1/2% of the net proceeds that may be received from the purchases therefor, without including any allowances received for transportation.

7. That the term "net mill receipts" shall mean the payments received at the mill for all ores including bonuses and freight allowances after deduction of actual costs of milling, smelting, treatment, freight, loss penalties imposed by virtue of existing impurities of the ore, or the imposition of other penalties, said bonuses being as defined by Circular No. 6, Atomic Energy Commission dated June 27, 1951.

8. That any payments to be received or to be paid as herein provided, shall in no event exceed those permitted or allowed by federal or state regulation or law, if any.

9. To conduct all operations, whether for exploration, prospecting or mining or otherwise, in a prudent, energetic, workmanlike and efficient manner, and with reasonable diligence carry

on said operations, and in all events with a minimum of resulting injury to the surface of said lands, and with safeguards to persons and livestock by erection of barriers, fences or other means, providing at all times proper gates or cattle guards for the containment of livestock upon the premises; to work the same in mine fashion in manner necessary to good and economical mining, so as to take out the greatest amount of ore possible, with due regard to the development and preservation of the mining premises, and to the special covenants herein contained.

10. To work and mine said premises as aforesaid, steadily and continuously during the period of this lease, and in doing said work to maintain as a minimum 80 man hours of labor per week, unless prevented by conditions of weather, federal or state regulations of laws, or acts of God, and on failure so to do to surrender and deliver up the premises in the condition herein provided.

11. All ores mined which are too low grade to present shipment shall remain the property of and subject to the control and disposition of the Lessor, unless such ores are shipped from the premises by the Lessee before the expiration of this lease.

12. That Lessee is not by this agreement invested with any property in any uranium or other minerals unless and until the same are severed from the ground, and all taxes, except income taxes, assessed against said demised premises for ores mined and shipped under this lease shall be paid by the Lessee.

13. All bills and expenses incurred by the Lessee or those in privity with him shall be promptly paid by the Lessee, and by such prompt payment said Lessee shall prevent the filing of any and all liens of miners, mechanics, or materialmen, against said demised premises; and, if by reason of the failure of Lessee to pay such bills or expenses, any lien or liens shall be filed against said premises the Lessor may forthwith pay off and discharge the same, and the Lessee holds himself bound to pay to Lessor all sums so advanced or paid to clear said premises from liens which may be filed as aforesaid, and the Lessor may also at his election declare a forfeiture of this lease.

14. Lessee further covenants that no person not in privity with the parties hereto shall be allowed to hold possession of said premises or any part thereof under any pretext whatever.

15. That upon the termination of this agreement, however, occurring, to surrender back the premises and his rights hereunder to Lessor, with such written releases, quit claim deeds or other instruments as necessary to effectively show the same.

16. The periods of time herein granted and provided therein the Lessee shall do and perform anything or take certain action, shall be extended by any delay occasioned or incurred by any official act of federal or state agency or department.

17. As between the parties hereto all improvements placed on the premises by Lessee shall be deemed personalty, to be removed by said Lessee within 30 days of the expiration hereof, however occurring.

16. Upon the violation of any covenant or condition herein contained, this lease shall at the option of Lessor expire, and terminate, and the said premises shall revert to the Lessor, and the Lessor or his agent may thereupon, after demand in writing for possession, enter upon said premises and dispossess all persons occupying the same, with or without force, and with or without process of law, or at the option of the Lessor the Lessee and all persons found occupying said premises or any part thereof may be proceeded against as guilty of unlawful detainer, subject to the provisions of Paragraph 17 hereof.

Lessor agrees that during the term hereof and while this lease is in force and effect that he shall not dispose of or sell the uranium or other minerals except gas and oil on said lands without first offering them to the Lessee upon the same terms and conditions as the same are offered to another or others, the terms of which Lessee shall accept within a period of 15 days after receiving notification thereof in writing or the same shall stand as being rejected by him.

This agreement shall extend to, inure to the benefit of and be binding upon the heirs, lawful assigns and legal representatives of the parties hereto.

IN WITNESS WHEREOF, The parties hereto have hereunto set their hands and seals the day and year first above written.

(signed) Lyman C. Ladwig (SEAL)
LYMAN C. LADWIG, LESSOR

(signed) George B. Frigon (SEAL)
GEORGE B. FRIGON, LESSEE

I certify that the above is a true copy.

Rose Lieberman Vine
Notary Public

My commission expires September 1955.

EXHIBIT "A"

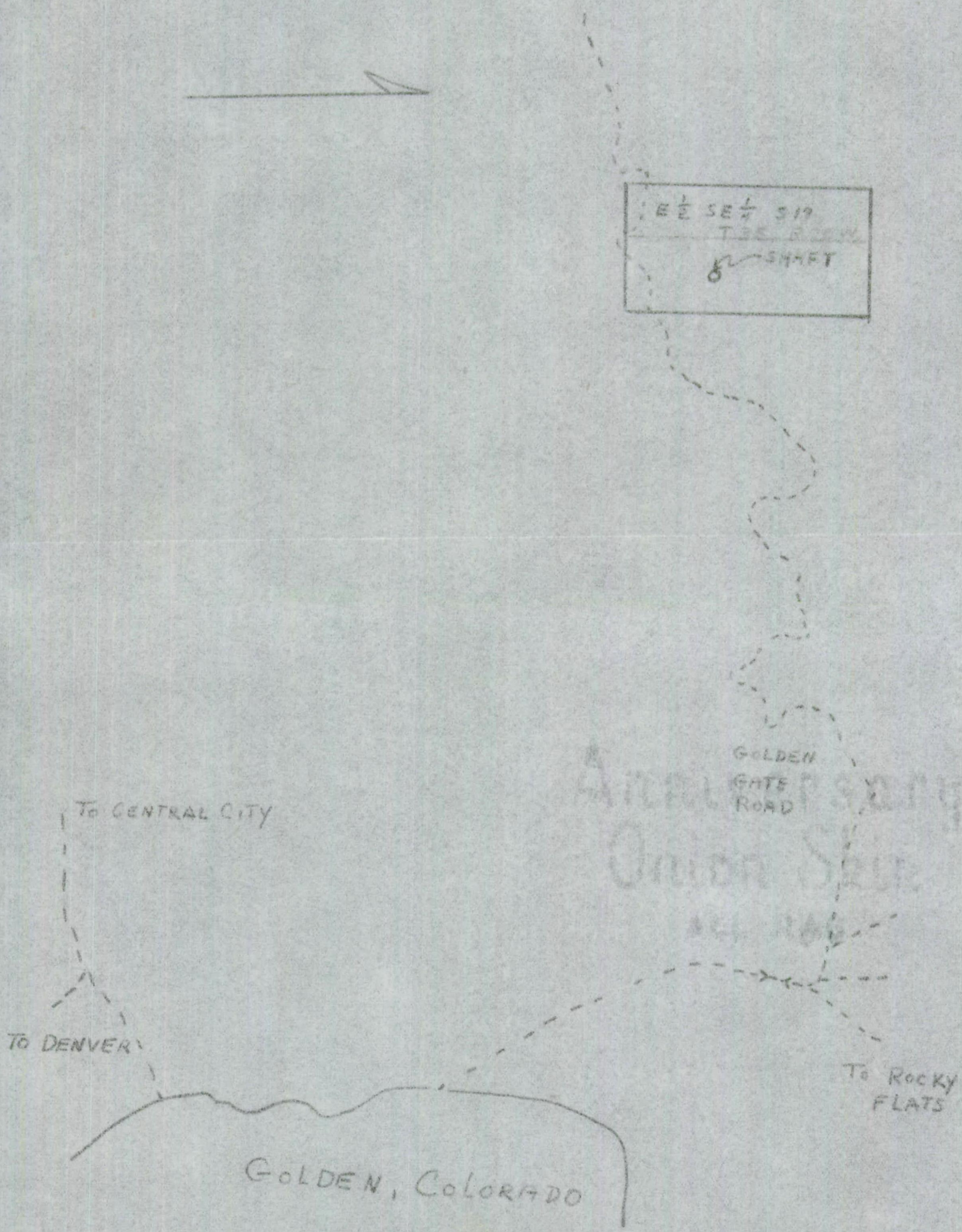

E½ SE¼ S19
T3S R69W
SHAFT
GOLDEN GATE ROAD
TO CENTRAL CITY
TO DENVER
TO ROCKY FLATS
GOLDEN, COLORADO

EXHIBIT B

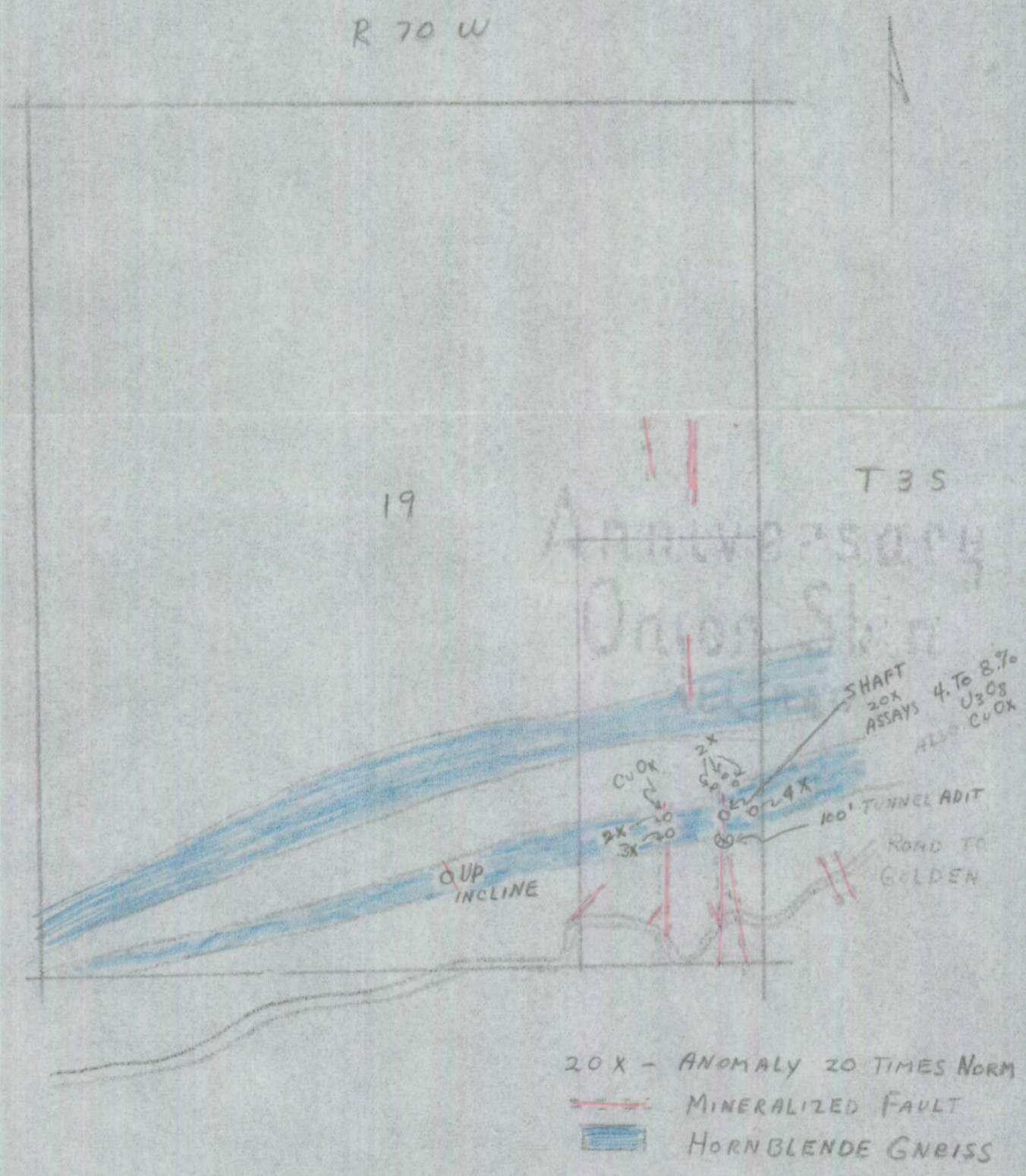
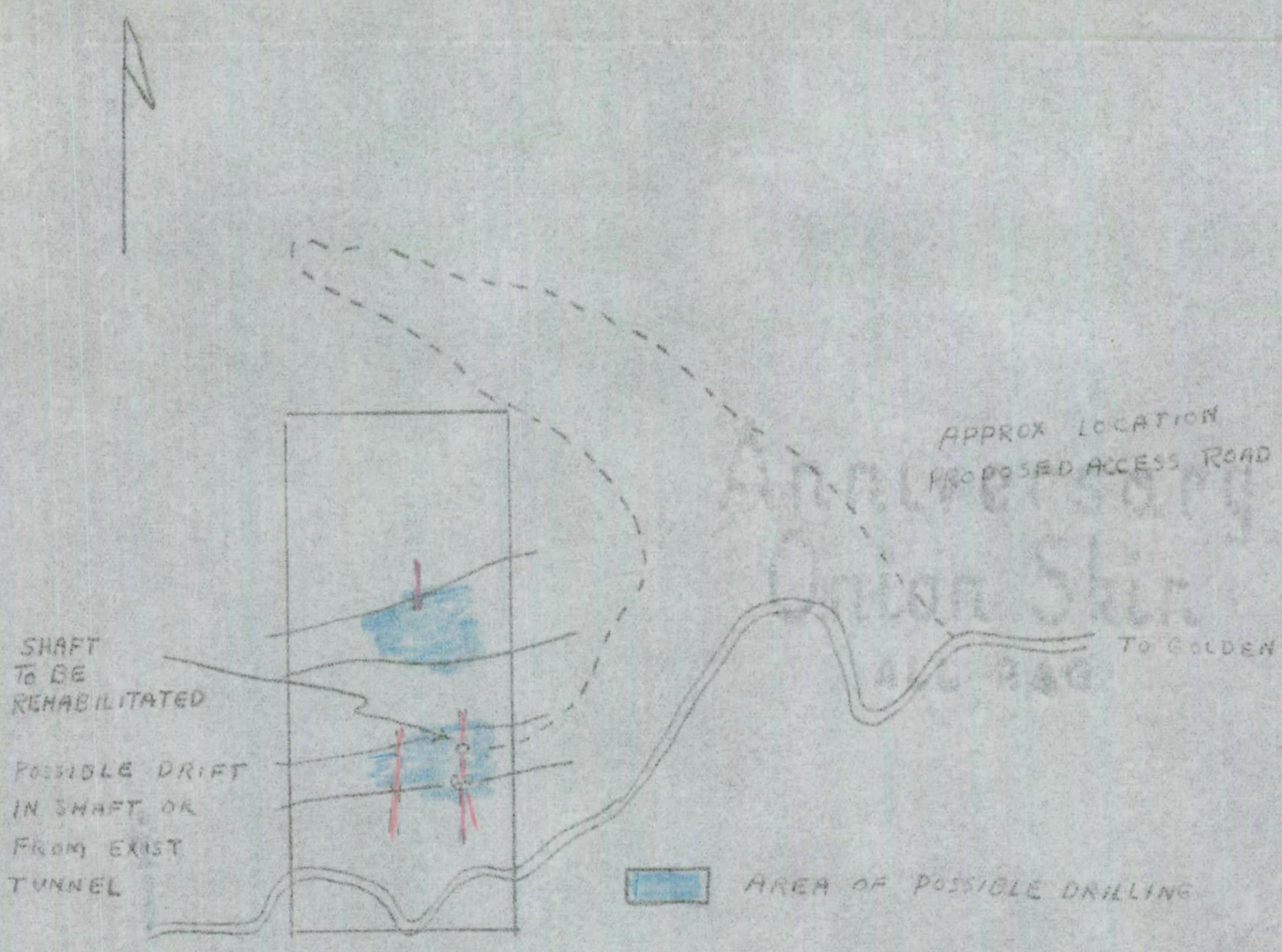

R 70 W
N
19
T 3 S
SHAFT
20X
ASSAYS 4. TO 8.%
U3O8
ALSO CuOX
CuOX
2X
3X
20
2X
Gp
0
0
24X
100' TUNNEL ADIT
ROAD TO
GOLDEN
UP
INCLINE
20 X - ANOMALY 20 TIMES NORM
MINERALIZED FAULT
HORNBLENDE GNEISS

EXHIBIT C

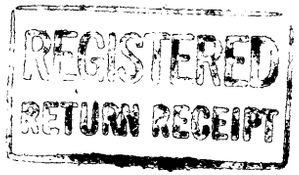

APPROX LOCATION
PROPOSED ACCESS ROAD
SHAFT
TO BE
REHABILITATED
POSSIBLE DRIFT
IN SHAFT OR
FROM EXIST
TUNNEL
TO GOLDEN
AREA OF POSSIBLE DRILLING

OFFICIAL BUSINESS

224 NEW CUSTOMHOUSE
DENVER 2, COLORADO

REG. MAIL - RETURN RECPT. REQUESTED

ADMINISTRATOR (Atten. Code 200)
DEFENSE MINERALS EXPLORATION ADMINISTRATION
UNITED STATES DEPARTMENT OF INTERIOR
INTERIOR BUILDING
WASHINGTON 25, D.C.



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