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

400

Noted - Com
YJ

May 11, 1953

MEMORANDUM

To: Administrator, DMEA

From: Iron and Ferro-Alloys Division, DMEA

Subject: Denial of application by Field Team, Region IV
Docket No. DMEA-2889 - Tungsten
J. F. Henderson and W. C. Kinnon
Flying Saucer Mine
Maricopa County, Arizona

The applicants requested exploration assistance in the amount of $32,000.00 to explore tungsten-bearing veins on the property of the Flying Saucer Mine, Maricopa County, Arizona.

The Flying Saucer mining property covers an area of medium-grained biotite granite, which has been invaded with later igneous rocks of varying types and in the nature of dikes. There is evidence of shearing and sheeting but not of great intensity. Except for small quartz veins and stringers, typical fissure vein structures are absent.

The tungsten mineralization consists of powellite and scheelite. The examination of the surface at night showed great areas of fluorescence which included granite and all dike rocks except a late basic dike.

Samples taken by the applicants at 5 different locations showed values of WO_3 ranging from 0.12% to 0.73% with an average of 0.49%. Samples from approximately the same locations by the Field Team showed - 0.01% to 0.20% WO_3.

The most reasonable explanation for the difference in the results obtained by the applicants and the examiners is in the accuracy of the assaying. However, it was believed that the assaying done by the Bureau of Mines was correct, as the pulps of three samples were checked closely by the Salt Lake City Laboratory of the Bureau of Mines.

After examining and sampling the areas of great fluorescence, the DMEA examiners concluded that the mining property does not warrant any kind of an underground exploration program. For this reason the Field Team, Region IV denied the application for exploration assistance Docket No. DMEA 2899.

We concur in the denial.

W S Martin

W. S. Martin, Acting Chief
Iron and Ferro-Alloys Division

FILE COPY
SURNAME:

UNITED STATES
DEPARTMENT OF THE INTERIOR 400
DEFENSE MINERALS ADMINISTRATION
WASHINGTON 25, D. C.

Hopkins
Martin

May 11, 1953

MEMORANDUM

To: Administrator, DMEA

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We concur in the denial.

W. S. Martin, Acting Chief
Iron and Ferro-Alloys Division

JHopkins:foc
5-11-53

cc: Docket
Code 400
Field Team, Reg. 4
Admr. Reading File

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

224 New Customhouse
Denver 2, Colorado

April 27, 1953.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
APR 30 1953

Memorandum

To: Administrator, Defense Minerals Exploration Administration
Attention: 200

From: Field Team, Region IV

Subject: Final Report, DMEA Docket 2889 (Tungsten), J. Frank Henderson and W. C. Kinnon, Flying Saucer Mine, Maricopa County, Arizona.

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

W. H. King
W. H. King

for A. H. Koschmann

Enclosures

Reviewed by
DMEA OPERATING COMMITTEE
5-6-53
(date)

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

224 New Customhouse
Denver 2, Colorado

April 27, 1953.

Mr. J. Frank Henderson
1317 E. Weldon Avenue
Phoenix, Arizona

Mr. William C. Kinnon
28 E. Catalina Drive
Phoenix, Arizona

Re: Docket DMEA-2889

Gentlemen:

Reference is made to your application for Government aid on the Flying Saucer Tungsten Mine.

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

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

Very truly yours,

W. H. King

W. H. King
Field Team, Region IV

Ogden Tuttle
for A. H. Koschmann
Field Team, Region IV

HMC:cwm

cc: Administrator, DMEA
WRStorms
RFRobinson
AHKoschmann (2)
Subject
Chron.

Reviewed by
DMEA OPERATING COMMITTEE
5-4-53
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Mining Division
Region IV

April 27, 1953.

Memorandum

To: Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: Final Report, DMEA Docket 2589 (Tungsten), J. F. Henderson and W. C. Kinnon, Flying Saucer Mine, Maricopa County, Arizona.

Enclosed are nine copies of the final engineering report on the subject docket. The Geological Survey did not participate in the field examination.

The examiners sampled the property and had check assays made. The average of all of the eight samples taken by the examiners was 0.06% WO_3, which is approximately one-tenth of the grade that the applicants believe they can mine.

The examiners recommend denial of the loan based on the extremely low values contained in the deposit.

We concur in this recommendation.

W. H. King
W. H. King

Enclosures

Reviewed by
DMEA [illegible] COMMITTEE
5-6-53
(date)

SOUTHWEST EXPERIMENT STATION
Box 4097
UNIVERSITY STATION

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
MINING DIVISION
REGION IV

Mining Division
Date Rec'd.
APR 23 1953
BUREAU OF MINES
Denver, Colorado TUCSON, ARIZONA

April 20, 1953

Memorandum

To : W. H. King, Chief, Mining Division, Region IV

From : Chief, Mining Methods Branch, Mining Div., Region IV

Subject : Final Report, Docket DMEA-2889, Flying Saucer Tungsten Prospect, Vulture Mining District, Maricopa County, Ariz.

Enclosed are original and 8 copies of a report on the above property by M. J. Elsing and W. R. Hardwick of the Bureau of Mines. As the Geological Survey did not participate in this examination, a separate report on Geology will not be submitted.

A considerable area on the property showed marked fluorescence at night under ultra-violet light, but analysis of several samples taken by the DMEA examiners from the best-appearing zones showed only 0.05 to 0.06 percent WO_3. As no evidence was noted to warrant the belief that exploration of any kind would develop ore of a higher grade, the examiners recommended that an exploration loan be denied. I concur with their recommendation.

Brochure is enclosed.

Walter R. Storms

Walter R. Storms

CC: W. H. King (8)
R. F. Robinson
DMEA-2889
DF

Reviewed by
DMEA OPERATING COMMITTEE
5-6-53
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA-2889, Flying Saucer Tungsten Prospect

Vulture Mining District, Maricopa County, Arizona

M. J. Elsing, Consulting Mining Engineer
U. S. Bureau of Mines

W. R. Hardwick, Mining Engineer
U. S. Bureau of Mines

April 1953

Reviewed by
DMEA OPERATIONS COMMITTEE
5-4-53
(date)

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By M. J. Elsing[1] and W. R. Hardwick[2]

On February 11, 1953, the Executive Officer, Field Team, Region IV, of the Defense Minerals Exploration Administration requested that an examination and report on the feasibility of an exploration project costing $30,399 be made on the Flying Saucer tungsten prospect, Vulture Mining District, Maricopa County, Arizona. The applicants and owners are J. Frank Henderson and W. C. Kinnon. The application is known as Docket DMEA-2889.

On March 16-18, 1953, M. J. Elsing and W. R. Hardwick visited the property and examined the various surface showings and shallow excavations. Samples were taken from representative places. The property was re-examined at night with ultra-violet ray lamps and some additional sampling was done.

The property is 11 miles southwest of Wickenburg and is favorably located in some rolling hills a few miles northwest of the old Vulture mine.

The country rock is a decomposed and altered granite which has been intruded by various igneous dike rocks. Examined at night with ultra-violet ray lamps the surface shows an exceptionally brilliant fluorescence which has a tendency to be yellow rather than white, possible indicating the presence of powellite. The fluorescence is confined to no particular formation and usually does not occur in veins. One area on Scorpion Hill showed brilliant fluorescence over an area some 200 by 400 feet in size. A second area of lesser size occurs about 700 feet to the east. There are smaller areas of strong, but less brilliant fluorescence on many parts of the claims.

1/ Consulting Mining Engineer, U. S. Bureau of Mines
2/ Mining Engineer, U. S. Bureau of Mines

The applicants have provided the assays of 6 samples. On the basis of these samples they believe that there are large sections from which ore can be produced from open cuts and from underground operations that will average 0.5 to 0.6 percent WO_3.

The DMEA examiners took 8 samples, 5 of which were a direct check of the sampling done by the applicants. The 5 samples taken by the applicants averaged 0.49 percent WO_3, whereas the samples taken by the DMEA examiners from these same places averaged less than 0.07 percent WO_3. The average of all 8 samples taken by the examiners was 0.06 percent WO_3, which is approximately one-tenth of the grade that the applicants believe they can mine.

In order to be doubly certain of the correctness of the assaying, pulp from 3 of the samples taken by the DMEA examiners was sent to the Salt Lake City laboratories of the Bureau of Mines for check assaying. The checks were exceedingly close and it is believed that all of the assaying as reported by the DMEA examiners can be accepted. The method of sampling this ore deposit cannot account for the difference in values since sampling this deposit is not difficult. Most of the material is soft and more or less uniformly mineralized. It is believed that the difference in the values obtained most likely is due to faulty assaying on the part of the applicants' assayers.

The examiners sampled areas of the most intense fluorescence and there is no evidence to warrant the belief that ore of anywhere near a profitable grade can be developed for the operation of a small flotation mill. Sampling also indicates that there is very little chance

that a large low-grade deposit, subject to mining by open-pit methods on a large scale, can be developed for profitable operation at the present market price of tungsten.

Because of these reasons, it is recommended that the request made by Henderson and Kinnon for a loan for the exploration of their Flying Saucer prospect be denied.

DMEA-2889, FLYING SAUCER TUNGSTEN PROSPECT
VULTURE MINING DISTRICT, MARICOPA COUNTY, ARIZONA

Engineering Report

By M. J. Elsing,
Consulting Mining Engineer
U. S. Bureau of Mines

W. R. Hardwick,
Mining Engineer
U. S. Bureau of Mines

April 1953

DMEA-2889, FLYING SAUCER TUNGSTEN PROSPECT
VULTURE MINING DISTRICT, MARICOPA COUNTY, ARIZONA

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INTRODUCTION

On February 11, 1953, the Executive Officer, Field Team, Region IV, of the Defense Minerals Exploration Administration requested that an examination and report on the feasibility of an exploration project costing $30,399 be made on the Flying Saucer tungsten prospect, Vulture Mining District, Maricopa County, Arizona. The applicants and owners are J. Frank Henderson and W. C. Kinnon. The application is known as Docket DMEA-2889.

On March 16-18, 1953, M. J. Elsing and W. R. Hardwick visited the property, examined the various surface showings, and the shallow excavations. Samples were taken from representative places. The property was re-examined at night with ultra-violet ray lamps and some additional sampling was done.

ACKNOWLEDGMENTS

Acknowledgments are due J. Frank Henderson and W. C. Kinnon, who are the owners and also the applicants. Henderson is presently Sales Engineer with The Dorr Company, and Kinnon is District Manager of the Southwestern area for Allis-Chalmers Manufacturing Company. Henderson received a degree as an electrical engineer from the University of Arizona in 1931 and since that date has been specializing in metallurgy. Kinnon is a mining engineer and practiced his profession from 1929 to 1937, when he joined Allis-Chalmers. Both of these men accompanied the examiners over the property. They are keen, practical, business men and have the operators' point of view. Many of their opinions relative to the flotation of scheelite and powellite ores, and the subsequent chemical treatment of the concentrates were of interest.

LOCATION, TOPOGRAPHY AND PHYSICAL FEATURES

The Flying Saucer deposit is situated in the Vulture Mining District, Maricopa County, Ariz. in Sec. 12, T. 6 N., R. 6 W. (see figure 1).

The property is reached from Wickenburg by following the Wickenburg-Vulture mine road for a distance of 10 miles southwest from Wickenburg. The Vulture road is left at this point by making a turn to the right, or to the west, and the Flying Saucer mine road is followed for 1 mile to the easterly edge of the property.

The topography is of the rolling hills variety without steep gradients. Small shallow washes drain the area both to the east and to the west. The vegetation is of the semi-arid variety and includes mesquite, palo verde, cacti, and small shrubs.

HISTORY AND PRODUCTION

Henderson and Kinnon located the six Flying Saucer claims between July 1952 and February 1953. Except for a small amount of trenching the discovery shafts are the only work on these claims. There has been no production from the property.

OWNERSHIP AND EXTENT

Henderson and Kinnon hold 6 lode mining claims by location, the docket and page number of which are recorded in the office of the County Recorder of Maricopa County, Phoenix, Ariz. as follows:

Name of Claim	Docket No.	Page No.
Flying Saucer	1045	462
Flying Saucer No. 1	1045	463
Flying Saucer No. 2	1045	464
Flying Saucer No. 3	1045	465
Flying Saucer No. 4	1045	466
Flying Saucer No. 5	Not recorded to date.	

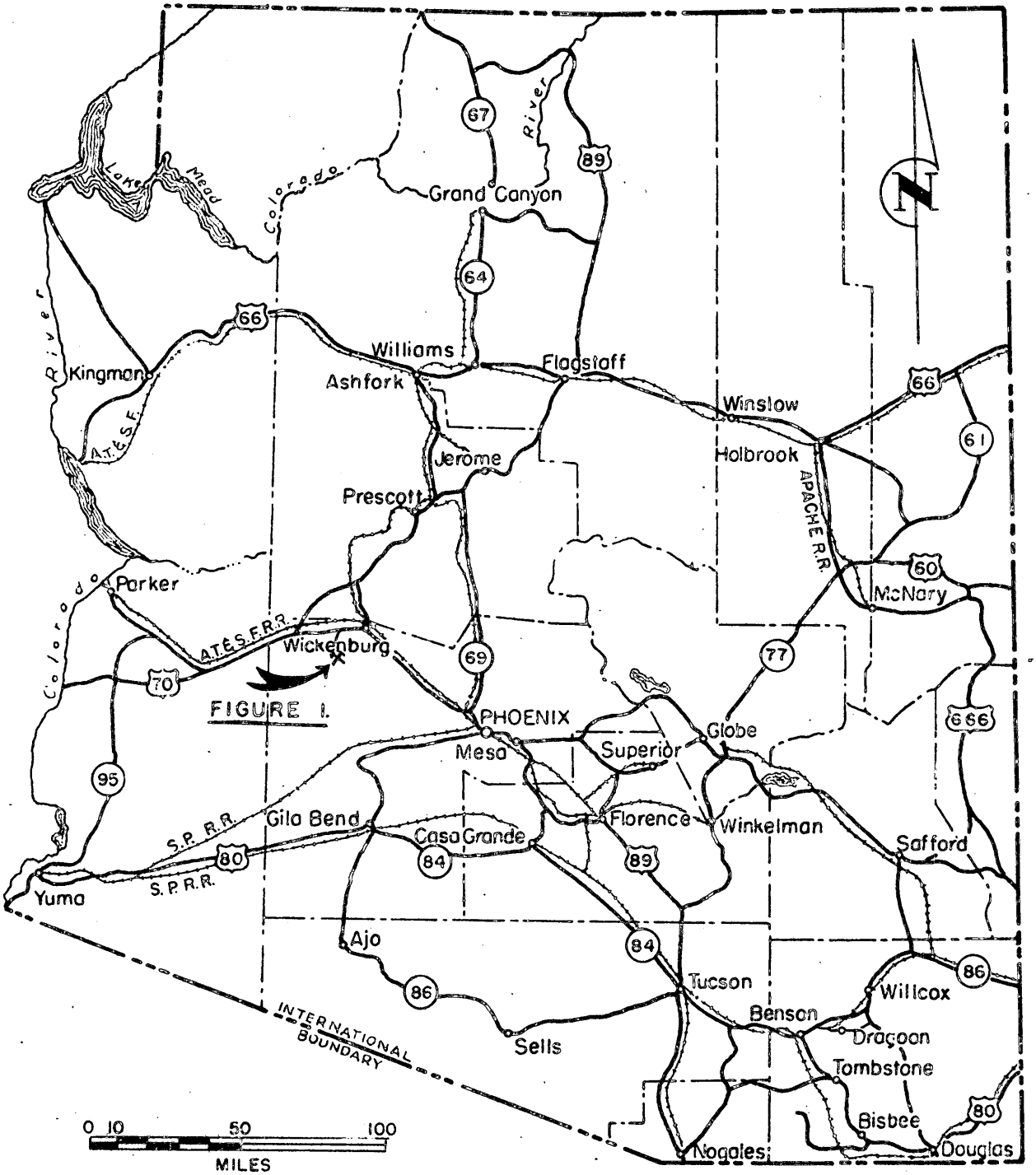


FIGURE I. - LOCATION MAP

FLYING SAUCER CLAIMS AREA - DMEA 2889

VULTURE MINING DISTRICT MARICOPA COUNTY, ARIZONA

DESCRIPTION OF THE DEPOSITS

The Flying Saucer group covers an area of medium-grained biotite granite (see figure 2). A number of later igneous rocks have intruded the granite. These include several kinds of porphyries, some pegmatites, and a basic intrusive. These dikes are irregular in shape and size. On the Flying Saucer and the Flying Saucer No. 4 claims there is a dike which roughly has the form of a large U. The two sides of this U-shaped dike are some 400 feet apart and more than 1,000 feet long. The dike is 50 to 75 feet wide and in places is very irregular in form. There are other fairly large dikes but they do not have any particular trend or pattern. In some places they are present in finger-like forms and occasionally they are quite small. In some places the granite is fine grained and has been largely replaced by quartz banding. In a few places there are quartz veins of short lengths and narrow widths. There is evidence of shearing and sheeting but not of great intensity. Except for small quartz veins and stringers, typical veins with definite hanging and footwalls are absent.

The tungsten mineralization consists of powellite and scheelite. The deposition of these minerals has not been particular to any kind of rock formation. The examination of the surface at night showed great areas of brilliant fluorescence which included granite and all the dike rocks, except a late basic dike. In crossing from one formation to another there is no visible change in the amount, character, and intensity of the fluorescence. It seems that each rock is as welcome a host as the next one. Powellite is more abundant than scheelite, but as far as could be seen there is no relation between the two minerals and the host rock.

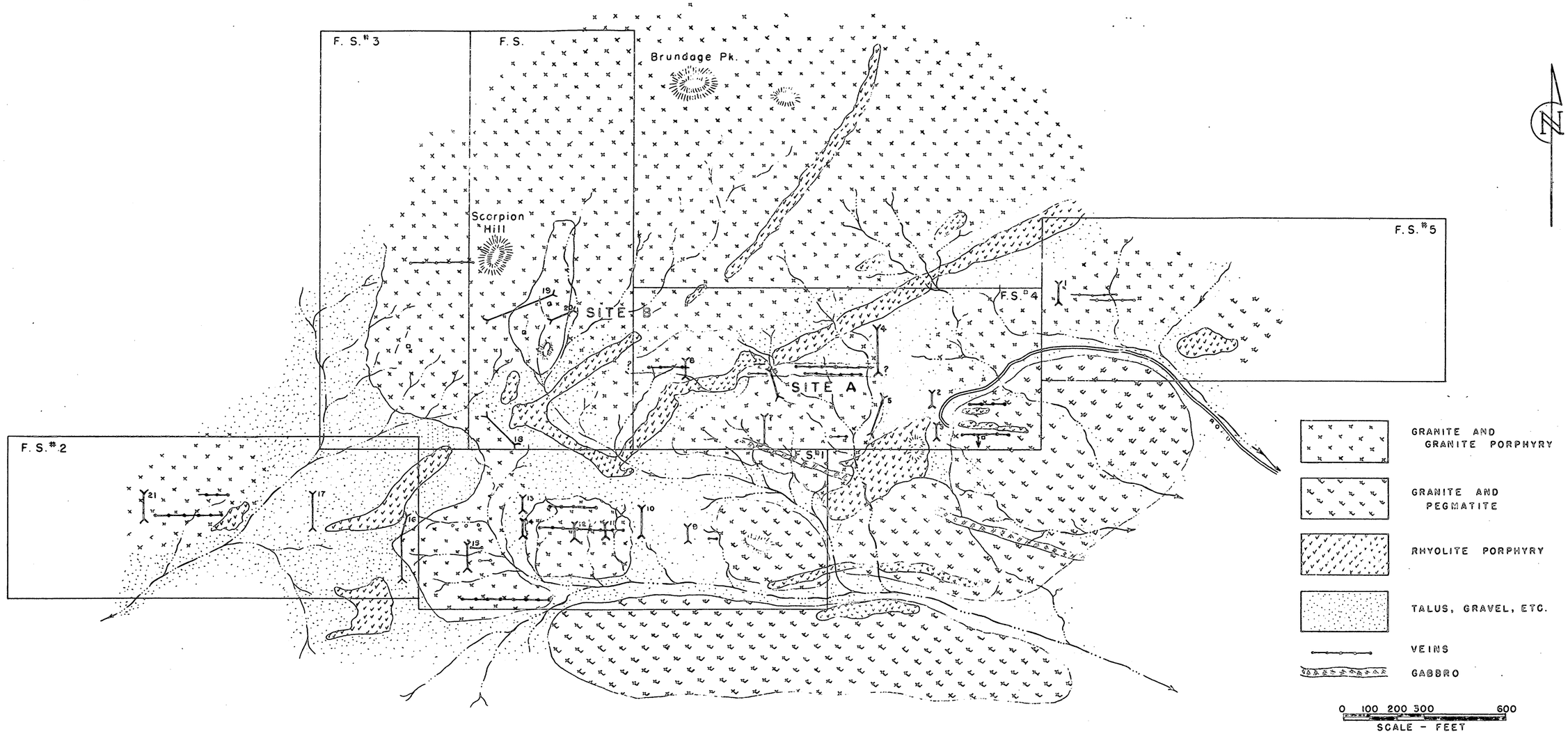


FIGURE 2. - GENERAL GEOLOGIC MAP OF FLYING SAUCER CLAIMS AREA (BY APPLICANT) SHOWING TRENCHES PROPOSED BY APPLICANT (PART I) - DMEA 2889

On Scorpion Hill the applicant has mapped one area of intense fluorescence that is 400 feet long with a maximum width of nearly 200 feet. This was the most interesting area because it represents a potential production of considerable size. For this reason it was sampled. The section mapped by the applicants by no means is the limit of the mineralized area. It might well include the entire area of Scorpion Hill.

A second large mineralized area occurs in the western half of the claim, Flying Saucer No. 4. There are scores of other showings of lesser size on the other claims of the group.

Most of the powellite and scheelite occurs as a dissemination through the rock in which it occurs. The most brilliant fluorescence occurs in roughly rounded forms from the size of a pin's head up to marble size. Streaks, stringers, and veinlets are largely absent. Powellite occurs in this form in the soft decomposed granite or the harder igneous dikes. Without the ultra-violet ray lamp it is impossible to recognize either the powellite or scheelite.

The most puzzling characteristics of this mineralization are the low WO_3 content for such brilliant fluorescence, and the impossibility of identifying the structural controls which limit its extent.

MINABLE ORE RESERVES

The property has no exploration or development of any kind and the character of the occurrence of powellite and scheelite is such that it is impossible to estimate ore reserves in any category. Sampling indicated that the brilliance and amount of fluorescence are no criteria of the WO_3 content of the material.

Eight samples were taken from various parts of the property. Five of these samples were taken from identical, or almost identical locations which previously had been sampled by the applicants. The location of each sample is shown on figures 3 and 4, and a description follows:

Sample No. 1:

Across 4 feet of decomposed granite, including a 4-inch quartz stringer, across the small gulch from applicant's proposed Adit A.

DMEA assay: Less than 0.01 percent WO_3.

Applicant's assay: 0.73 percent.

Sample No. 2:

Channel sample along 15 feet of a shallow trench, 100 feet southwest of location shaft on Flying Saucer claim, Scorpion Hill.

DMEA assay: Less than 0.01 percent WO_3.

Applicant's assay: 0.45 percent.

Sample No. 3:

General grab sample of dump of shallow cut described under Sample No. 2.

DMEA Tucson assay: Less than 0.01 percent WO_3.

DMEA Salt Lake City assay: 0.04 percent.

Applicant's assay: 0.45 percent.

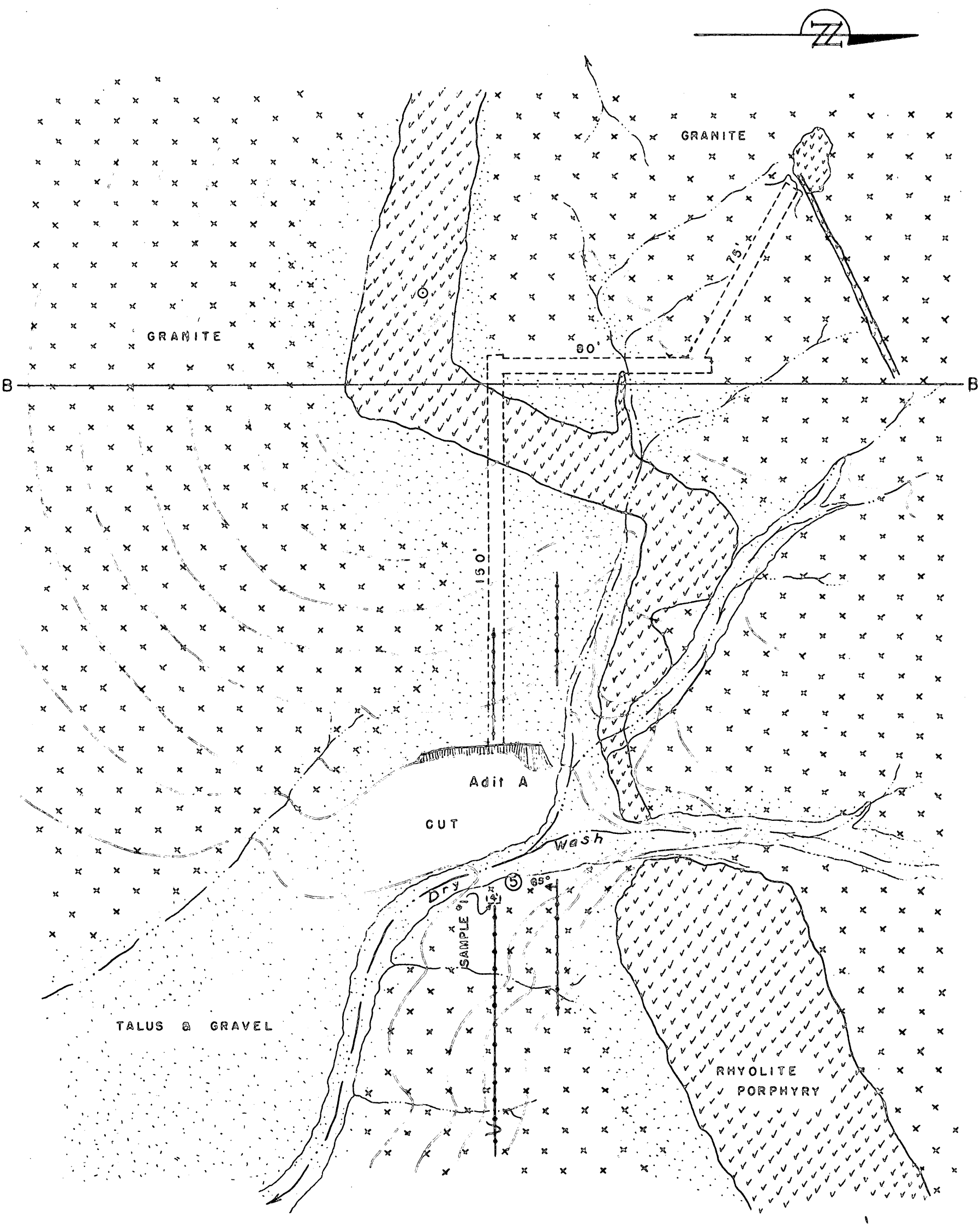
Sample No. 4:

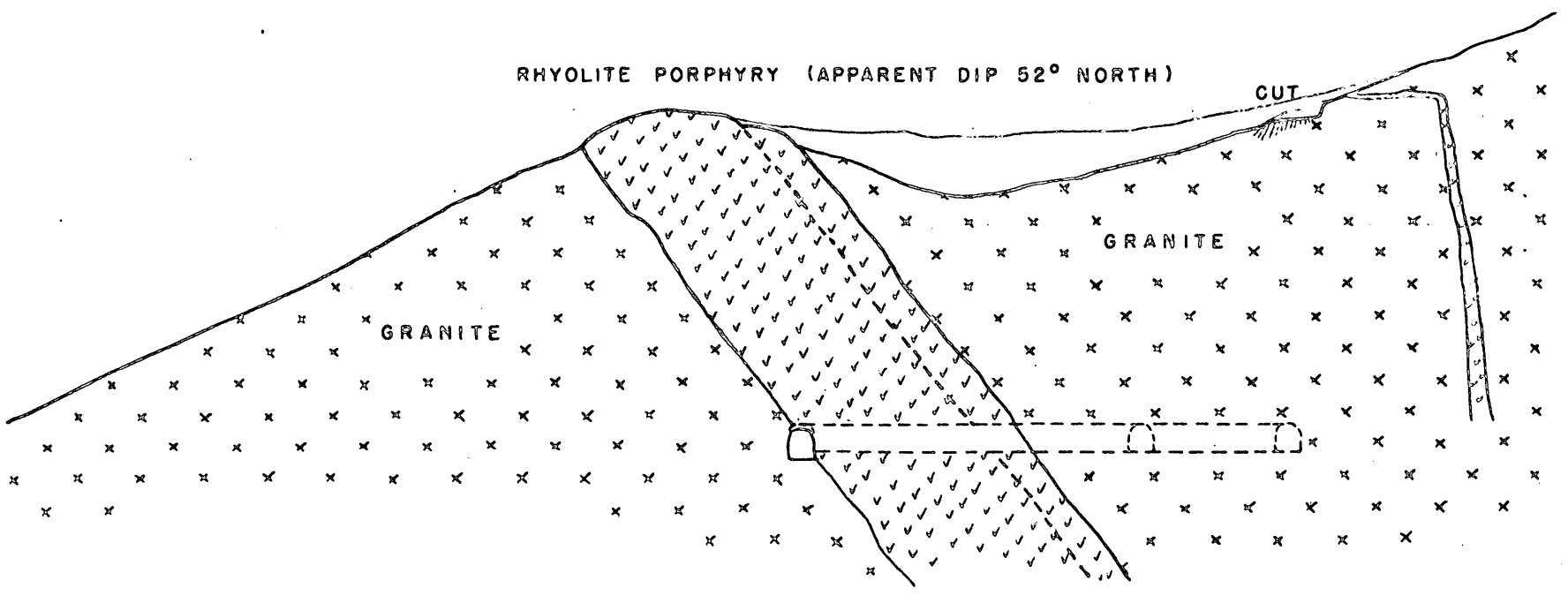
Grab sample of dump from location pit, or discovery shaft on Flying Saucer claim, Scorpion Hill.

DMEA Tucson assay: 0.08 percent WO_3.

DMEA Salt Lake City assay: 0.10 percent

Applicant's assay: 0.21 percent.





SECTION B – B'

SITE "A"

1 ASSAYS BY APPLICANT

1 ASSAYS BY EXAMINERS

EXPLORATION PROPOSED BY APPLICANT

0 20 40 80

SCALE - FEET

FIGURE 3. - PROJECT NO. 2, FLYING SAUCER CLAIM NO. 4 - DMEA 2889

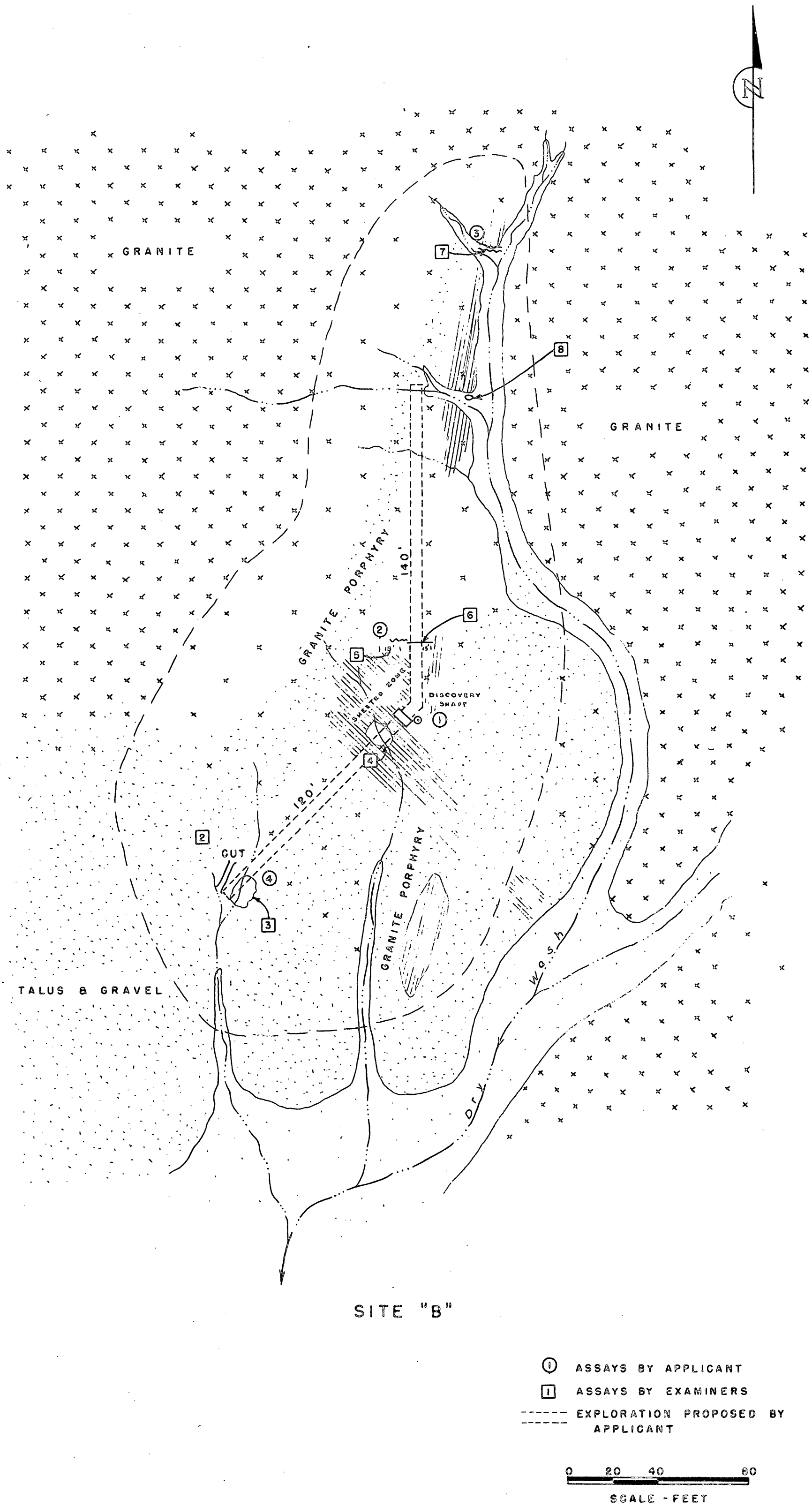


FIGURE 4 - PROJECT NO. 3, FLYING SAUCER CLAIM - DMEA 2889

Sample No. 5:

Channel sample along 12 feet of a trench, 30 feet north of discovery shaft on Flying Saucer claim, Scorpion Hill.

DMEA Tucson assay: 0.20 percent WO_3.

DMEA Salt Lake City assay: 0.22 percent.

Applicant's assay: 0.63 percent.

Sample No. 6:

Grab sample along a 15-foot extension to the east of Sample No. 5, showed considerable fluorescence but not as much as sample No. 5.

DMEA Assay: 0.08 percent WO_3.

Sample No. 7:

Channel sample across 10 feet of sheared granite, 210 feet north of discovery shaft on Flying Saucer claim,Scorpion Hill. A brilliantly fluorescent area.

DMEA assay: 0.06 percent WO_3.

Applicant's assay: 0.45 percent.

Sample No. 8:

Channel sample across 2.0 feet of sheared granite, 145 feet north of discovery shaft on Flying Saucer claim, Scorpion Hill. Supposed to be high grade ore.

DMEA assay: 0.02 percent WO_3.

The applicants' Sample No. 1 was taken from the perimeter of the discovery shaft on the Flying Saucer claim. This sample assayed 0.21 percent WO_3 and should roughly check the DMEA examiners' Sample No. 4, which was a grab sample of the dump from the discovery shaft. The DMEA assay of No. 4 was 0.08 percent WO_3.

The applicants' sample No. 2 was from the trench 30 feet north of the discovery shaft on the Flying Saucer claim. It assayed 0.63 percent WO_3 and should check with the examiners' Sample No. 5 which assayed 0.20 percent WO_3.

The applicants' sample No. 3, assaying 0.43 percent WO_3, and the examiners' sample No. 7, assaying 0.06 percent WO_3 are from approximately the same place.

The applicants' sample No. 4, assaying 0.45 percent WO_3, and the examiners' samples Nos. 2 and 3, each of which assayed less than 0.01 percent WO_3 are from approximately the same place.

The applicants' sample No. 5, assaying 0.73 percent, is from the same location as the examiners' sample No. 1 which assayed less than 0.01 percent WO_3.

A tabulated comparison of these assays is shown below:

Samples from approximately the same locations

Taken By		Percent WO_3	
Applicants	Examiners	Applicants	Examiners
No. 1	No. 4	0.21	0.08
No. 2	No. 5	.63	.20
No. 3	No. 7	.43	.06
No. 4	Nos. 2 & 3	.45	-.01
No. 5	No. 1	.73	-.01
	Average	0.49	0.07

The most reasonable explanation for the difference in the results obtained by the applicants and the examiners is in the accuracy of the assaying. It was believed that the assaying done by the Bureau of Mines was correct. On the other hand, the applicants are very competent and experienced engineers and have had great mining and metallurgical experience. They are fully aware of the difficulty of assaying low-grade

tungsten ore. In order to make absolutely certain that the Bureau of Mines original assaying was correct, the examiners sent the pulps of three samples to the Salt Lake City Laboratory of the Bureau of Mines to be check assayed. The check assaying confirmed the opinion that the original DMEA assaying was correct. The results are as follows:

Percent WO_3		
Original Assays		Check Assays
Applicant	Examiners	Examiners
0.45	0.01	0.04
.21	.08	0.10
.63	.20	0.22

PRESENT STATUS

Exploration and Development

The property has no exploration or development work. The only work of importance is a discovery, or location pit on each of the 6 claims comprising the group.

Mining and Milling Equipment

The property has no equipment of any description.

PROJECT PROPOSALS

The applicants have proposed an exploration plan that includes three parts as follows:

Project 1. Bulldozing (figure 2).

There are from 6 inches to 3 feet of talus covering parts of the surface and the applicants believe it is necessary to remove this talus in cuts in order to better delineate the limits of the mineral showings. To accomplish this they propose to make 21 trenches or cuts across various showings from claim No. 5 to claim No. 2, a distance of 3,500 feet. The

approximate length of these cuts is 1,200 linear feet. They also wish to level off a tunnel site and a shaft site with the bulldozer.

A D-8 bulldozer can be contracted for at $100 per day. The applicants believe that it will take one day to move in and one day to move out and that bulldozing can be done in 18 days. The total cost of this part of the project will be $2,000.

Project 2. Tunnelling (figure 3, Site A).

The applicants propose to drive an adit 150 feet long, then from this adit drive a crosscut and a drift for 155 feet, making a total of 305 feet. No part of this tunnelling will attain a depth below the surface of more than 75 to 80 feet and most of it will be considerably less. The total cost of this work will be $10,400.

Project 3. Shaft sinking and drifting (figure 4, Site B).

The applicant proposes to enlarge the present discovery shaft on the Flying Saucer claim and sink it to a depth of 75 feet, then from the bottom drive 120 feet southwest and 140 feet due north. The drift to the southwest will have a depth below the surface of approximately 75 feet for its entire length but the drift to the north will gain some additional depth. The proposed shaft sinking and drifting will cost $15,430.

A detailed breakdown of the cost of the project is as follows:

Project 1.	Bulldozing		$ 2,000
Project 2.	Tunnelling Site A		
	Tunnelling, 305 ft. @ $30	$ 9,150	
	Timber	750	
	Miscellaneous	500	10,400

Project 3. Shaft sinking and drifting		
Headframe	$ 450	
Shaft sinking, 80 ft. @ $75..	6,000	
Timber & labor, 30 ft. @ $6..	180	
Station at 75 ft. level	250	
260 ft., 4' x 6' drift @ $30.	7,800	
Miscellaneous	750	$15,430
Labor, supervision, consultants		
Supervision		
Board and room ($8.00 per day, 4 days per week for 36 weeks)	$ 832	
Travel, 200 mi. per week @ 6¢, 26 weeks	312	1,144
Consultant's examination, 5 days @ $75.00		375
Miscellaneous		
Assaying, 150 assays @ $5	$ 750	
Accounting	300	1,050
Contingencies		1,601
Total		$32,000

PRODUCTION PLAN

Time Schedule for Completion of Project

The applicants anticipate that the exploration project which they propose can be completed in 26 weeks.

Rate of Production

The applicants anticipate the rate of operation after the installation of a 50-ton flotation mill will be 50 tons per day of ore having an average content of 0.5 percent WO_3. On the basis of an over-all recovery of 79 percent (mill recovery 85 percent, chemical recovery 93 percent) and operating the mill for 25 days per month, 10,463 pounds of WO_3 will be produced per month.

Mining Methods and Costs

Since no ore reserves have been developed it is difficult to predict the method of mining and costs. The applicants anticipate production will come from a tunnel level at Site A and from a 75-foot shaft and drifts at Site B. On the basis of any presently available information it would be unwise to estimate that the present day underground mining cost would be less than $7.50 per ton on the basis of a production of 50 tons per day from substantially large ore bodies.

Milling Methods and Costs

Kinnon provided the following information relative to the treatment of ore that might be found at the Flying Saucer mine: "Preliminary laboratory tests on several samples of the ore indicates that flotation will recover between 90 and 95 percent of the scheelite and powellite in a bulk concentrate. Stage crushing and screening to produce minimum slimes would be used in conjunction with grinding in a rid mill[1/] to prepare the flotation feed. The flotation tailings would be put over tables to check the efficiency of the flotation work and recover any free gold in the pulp.

"From the present laboratory work we estimate the concentrate will carry 15 to 25 percent WO_3 and 10 to 20 percent MoO_3. The ore is remarkably free of calcite which is responsible for the relatively high grade WO_3 content indicated in the flotation concentrate.

1/ Rid mill should read rod mill.

"From the spectrographic analysis of the concentrate there is no sulphur, phosphorus, arsenic, or bismuth. Minor quantities of manganese, copper, chromium and titanium were detected together with some iron, alumina and silica.

"Chemical treatment of the bulk concentrate would consist of the pressure reactor process using dilute soda ash solution and finely ground concentrate under elevated pressure and temperature. This would be carried out in small batch autoclaves in which the tungsten is converted into soluble sodium tungstate and the molybdenum dissolved similarly, while copper, lead and silica remain in the residue. After filtering, the filtrate would be treated with calcium chloride which precipitates $CaWO_3$, the synthetic scheelite. Ammonium paratungstate solution (a saleable product) could be produced by precipitating the sodium tungstate solution with HCl plus HNO_3 and dissolving the H_2WO_4 precipitate in ammonia. The solution is then evaporated and the crystallized product dried and sacked.

"The pressure chemical treatment of powellite-bearing tungsten concentrates is not new. Several batch reactors and continuous digestor plants are in steady operation in the U.S. The synthetic scheelite produced contains between 60% and 65% WO_3 and usually demands premium price on the market.

"To start with we would figure on a flotation concentrator to treat 50 T of ore per 24 hours using a selective mining system to maintain a mill head of .5% to .6% WO_3. We estimate a plant of this size would cost about $35,000. The chemical plant would have a capacity of 1 ton (2,000 lbs.) per day of bulk concentrates. The cost is estimated at about $22,000.

"The better recovery effected by flotation of 10 to 15% will pay most if not all the cost of chemical treatment of the concentrates.

"Besides the highly desirable synthetic scheelite or ammonium paratungstate the molybdenum would be recovered as a valuable by-product".

Laboratory table tests were made by the applicants on the following samples:

No. 1. Banded ore from Scorpion.

No. 4. Granite from Scorpion.

No. 5. Site "A" (vein and granite walls).

No. 6. South vein.

The results are tabulated as follows:

Laboratory Table Tests - Flying Saucer

Sample No.	Wt. Feed	Wt. Conc't.	% Wt. Conc't.	% WO_3 Conc't.	Est. % Recovery	% WO_3 Feed	% MoO_3 Conc't
1	2,200	19	0.865	27.16	50	.468	5.91
4	1,852	13	0.700	32.06	50	.448	7.27
5	1,639	19	1.160	37.53	60	.726	2.86
6	1,183	42	3.55	12.56	50	.892	34.15

Kinnon's estimate that a 50-ton flotation mill will cost $35,000 seems low, particularly if it includes power and the development of water. In all probability with water and power the cost will be at least $75,000. The discussion of the cost of a mill at this time is academic as the important consideration is whether or not sufficient profitable ore can be developed.

George H. Roseveare, metallurgist for the Arizona Bureau of Mines, was consulted in regard to tests he was reported to have made on Flying Saucer ore. These tests to date were of a preliminary nature without assays and therefore contributed nothing of value. Rosevear provided some valuable general information regarding metallurgical recoveries and chemical losses in the treatment of scheelite ore. The average recovery in gravity mills is 60 percent. With a combination of gravity and flotation, recoveries average from 80 to 90 percent. The chemical treatment of concentrates results in an average recovery of 93 percent of the WO_3 contained. The cost of the chemical treatment of scheelite concentrates ranges between $12 to $15 per unit of WO_3.

SUMMARY: COST OF PROJECT

Capital Requirements, Including Development

If sufficient ore is developed at the Flying Saucer to warrant the construction of a 50-ton concentrator and a batch chemical treatment plant, the necessary capital investment would be on the order of $175,000. This is broken down as follows:

Mine plant	$35,000
Mine development	25,000
Flotation mill incl. water.	75,000
Chemical plant	30,000
Total	$165,000
Working capital	10,000
Total	$175,000

Operating Costs

It is difficult to estimate the costs of production of a mine that has no development. In order to operate profitably the applicants believe that the grade of their ore should be 0.5 to 0.6 percent WO_3. An

analysis of the general run of costs for small mining and milling operations justifies such an assumption. The estimate of the cost of production is partly estimated and partly calculated. The calculated costs are based on the following data:

Mill heads, 0.5 percent WO_3 or 10 lbs. per ton.

Flotation recovery, 85 percent. (This is lower than the applicants calculate but is more in accord with actual practice).

Chemical recovery, 93 percent.

Over-all recovery, 79 percent.

Pounds of WO_3 recovered per ton 7.9 lbs.

Cost per unit WO_3 for chemical treatment, $15.00.

Cost per pound WO_3 for chemical treatment, $0.75.

Cost per ton of ore for chemical treatment, $5.93.

Value per pound of WO_3, $3.15.

Value per ton of ore (7.9 x $3.15), $24.89.

Loan repayment, 5% royalty, per ton ore, $1.24.

Sales tax per ton of ore, $0.25.

Cost of mine plant and development, mill, chemical plant and other facilities, $165,000.

An estimate of the total costs of production follows:

Approximate Costs of Production of Scheelite from 50 tons of ore mined and milled per day with chemical treatment of concentrates

	Per ton
Estimated Costs	
Mining from fairly large deposits	$ 7.50
Transportation of ore to mill	1.00
Milling by flotation including water	5.00
Overhead and miscellaneous	2.50
	$16.00
Calculated Costs	
Chemical treatment of concentrates	$ 5.93
Royalty-loan repayment	1.24
Sales tax	0.25
Total before amortization & income taxes	$23.42
Amortization, $140,000/100,000 tons ore	1.40
Total before income taxes	$24.82
Value of 0.5 percent WO_3 ore per ton	$24.89
Value of 0.6 percent WO_3 ore per ton	29.86

Estimated Profit or Loss

On the basis of the foregoing analysis of costs, it is rather evident that in order to operate profitably a 50-ton flotation mill it is essential that the ore should contain approximately 0.6 percent WO_3. The capital required for a complete 50-ton per day plant would be approximately $175,000 of which $10,000 would be working capital. The chances are that the salvage value of a 50-ton mine and mill plant would not be more than $25,000. Therefore the amount to be amortized would be $140,000 which would require 100,000 tons of ore if amortization was at the rate of $1.40 per ton.

PROPOSED FINANCING

The applicants anticipate that including 5 percent for contingencies, the total cost of the project will be $32,000. They propose that either one or the other of the 2 partners will spend 4 days per week, excluding Saturdays and Sundays, supervising the operation of the project. For such services they request only that they be allowed $8.00 per day for room and board for 4 days per week for 26 weeks, or a total of $832, and 200 miles of travel allowance per week at 6 cents per mile for 26 weeks, or $312, making a total of $1,144. On this basis the owners will provide the required engineering services including sampling and mapping. With a total cost of $32,000, the owners share on the basis of one-quarter participation by them will be $8,000 and the Government's share will be $24,000. Crediting the owners with travel and living expenses of $1,144 leaves their share $6,856 which "amount will be available as cash under any arrangement desirable by the Government".

CONCLUSIONS

The results of sampling done by the DMEA examiners does not warrant any kind of an underground exploration program. The applicants have taken a total of 6 samples, 3 of which were assayed with the following results:

		Percent WO_3
1.	Discovery shaft perimeter	0.21
2.	3 feet along trench	0.63
3.	6 feet along trench	0.43

They also took 3 samples which weighed from 5 to 10 pounds. These were stage crushed through a 35-mesh screen and run over a laboratory-

size Wilfley table. The concentrates were assayed and weighed and the grade of the crude ore was calculated. The concentrates assayed from 30 to 45 percent WO_3 and 3 to 8 percent MoO_3. On the basis of these 6 samples the applicants state "Large areas of mineralization will afford mill heads of 0.4 to 0.8 percent WO_3"

The matter of immedaite interest to the DMEA examiners was to determine the grade of these "large areas of mineralization". Therefore, they took 8 representative samples of areas which the ultraviolet lamps indicated was strongly fluorescent and which the applicant had already sampled and found to be of commercial grade. The examiners samples ran approximately one-tenth of the value obtained by the applicants.

In order to substantiate the accuracy of their assaying the examiners sent the pulp of 3 samples to the Salt Lake City Laboratory of the Bureau of Mines for check assaying. The check assaying was remarkably close and since the examiners have confidence in their method of sampling they have come to the conclusion the sampling or assaying or both, which was done for the applicants, was misleading and incorrect, and that instead of having ore averaging 0.5 to 0.6 percent WO_3 the average is nearer 0.05 to 0.06 percent WO_3.

No evidence was seen to warrant the belief that exploration of any kind would develop ore of a higher grade. Therefore, further exploration work cannot be recommended.

The startling amount of fluorescence is either a very thin paint-like occurrence of powellite and scheelite, or perhaps a part of the

fluorescence is caused by calcite or some other unidentified mineral with very minor amounts of WO_3.

RECOMMENDATIONS

The examiners recommend that the application of Henderson and Kinnon for an exploration project on their Flying Saucer prospect be denied because sampling and assaying indicate that no ore anywhere near a profitable grade can be developed for the operation of a small flotation mill, and also because there is very little chance that a large low-grade deposit of tungsten ore subjectto mining by open-pit methods on a large scale can be developed for profitable operation at the present market price of tungsten.

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

224 New Customhouse
Denver 2, Colorado

February 13, 1953

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
FEB 16 1953

Memorandum

To: Administrator, Defense Minerals Exploration Administration
Attention: 200

From: Executive Officer, Field Team, Region IV

Subject: Docketing for Exploration Assistance

Enclosed herewith in duplicate is DMA Form 3a and Form MF-103 in duplicate and supporting data pertaining to the following applications for Government assistance in exploration work:

Gordon R. French
316 West Montebello Ave. dmea 2887
Phoenix, Arizona

Fred Schwartzwalder
207 Boyd St.
Golden, Colorado

J. Frank Henderson
1317 E. Weldon Ave.,
Phoenix, Arizona

and

Wm. C. Kinnon
28 E Catalina Drive
Phoenix, Arizona

W. H. King
W. H. King

Enclosures

dmea 2889

February 7, 1953

Executive Officer, DMEA
224 New Customhouse Bldg.
Denver 2, Colorado

Dear Sir:

We are attaching herewith our application in quadruplicate for a DMEA exploration loan.

As you will note, we have a rather extensive surface showing of tungsten at our Flying Saucer property. This is a new property, original discovery being made by us.

The opportunity to show the property to your examination team will be greatly appreciated.

Very truly yours,

J. Frank Henderson

J. Frank Henderson

Wm. C. Kinnon

Wm. C. Kinnon

JFH:ec

Encs.

MF-103 (INTERIOR)
(Revised April 1952)

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
FEB 1 3 1953

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. dmea 2889
Metal or Mineral
Date Received 2-16-53
Estimated Cost
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: (a) J. Frank Henderson 1317 E. Weldon Ave., Phoenix, Arizona
(d) William C. Hannon 28 E. Catalina Dr. Phoenix, Arizona

(b) Partnership-Arizona

(*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 Six mining claims in the Vulture Mining district, approximately 11 miles southwesterly from Wickenburg, Arizona.

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

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

(*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.

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

(*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*) [redacted]e the mineral or minerals for which you wis[redacted] explore Tungsten

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

(*c*) The work will start within 30 days and be completed within 6-8 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)?

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

☐ Money ☒ Use of equipment owned by you ☐ Other

Explain in detail on acompanying paper.

CERTIFICATION

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

Dated Feb 7, 1953

J. Grant Henderson
(Applicant)

By W. E. Simmon

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

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

EXPLANATION OF APPLICATION

3 (f) Recorded Maricopa County, Arizona - Court House

Flying Saucer			Docket 1045		Page 462
"	"	No. 1	"	"	" 463
"	"	No. 2	"	"	" 464
"	"	No. 3	"	"	" 465
"	"	No. 4	"	"	" 466
"	"	No. 5	Now being recorded		

4 (a) No mining has ever been done on these claims. The tungsten mineralization was discovered by us and exploration work to date has consisted of discovery shafts required by statute, plus several small open cuts and trenches made for the purpose of delineating the ore bodies and providing samples for assay and metallurgical testing.

4 (b) There has been no previous production and there is no blocked out ore reserves.

4 (c) The property lies in a mountainous area of moderate relief cut by dry washes which in the eastern portion of the property drain southeasterly and in the western portion southwesterly.

The basal or oldest rock is a medium grained biotite granite intruded by dikes and masses of rhyolite porphyry and quartz porphyry. Relatively basic lamprophyric intrusives form dikes and irregular masses particularly in and near zones of shearing.

Pre-rhyolite shearing in the granite has occured from the east to west as evidenced by a series of fissure type veins occuring one after another from north to south over a distance of a mile or more. Varying in width from a few feet to 8 or 10 feet the veins are partly filled with quartz, developing more quartz to the west where at places it is 4 or 5 feet wide. Pronounced alteration of the granite to sericite along the fissures and their regularity classifies them as mesothermal.

Shearing bearing N 10 E has occured in zones at irregular intervals and also in closely spaced fractures bearing N 38 W.

Scheelite and powellite are found in the veins occuring in the quartz and filling and sometimes disseminated in the granite wall rock. On the general geologic map the principle occurances of the tungsten mineralization along the veins have been marked in red pencil.

Along the shear zones disseminated replacement deposits of scheelite and powellite occur. The largest mineralized zone so far found is on the Flying Sacuer claim being approximately 400 ft. long by 100 ft. wide. (See sketch 2) Samples cut from the discovery shaft (depth 8') and several trenches at the points indicated on sketch 2 were assayed with the following results:

1.	Discovery shaft perimeter	0.21% WO_3
2.	3' along trench	0.62 "
3.	6' " "	0.43 "

On the Flying Saucer No. 4 claim where parallel east west veins are intersected by a N 65 E trending rhyolite porphyry dike dipping northwest both the granite and the porphyry contain scheelite and powellite at or near the junction. The mineralized area is outlined on sketch No. 1. Contacts zones between the porphyry and the granite are observed to carry tungsten value and should be explored.

As new areas of tungsten mineralization have been discovered we have endeavored to check the ores for recoverable tungsten content. To avoid the error which seems to be inherent in assaying low grade ores, we have checked many samples by the following method:

(1) Cut 5 to 10 lb. sample, stage crush thru 35 mesh, and cut 2000 gram minus 35 mesh sample.

(2) Table this sample once over a laboratory size Wilfley table and cut only a rougher or one stage concentrate.

(3) Weigh the concentrate and assay for WO_3 and Mo_3.

This methods affords probably 60% recovery of the minerals, which keeps the work on the safe side for estimating purposes, and provides a concentrate of good enough grade for subsequent chemical treatment.

Having a weighed and assayed concentrate, head values are calculated on the basis of recovery made by this method. Our results indicate that large areas of mineralization will afford mill heads of 0.4 to 0.8% WO_3. The concentrates assayed from 30 to 45% WO_3 and 3 to 8% MoO_3.

4 (d) The property is approximately eleven (11) miles southwesterly from Wickenburg, Arizona and one mile westerly off the Wickenburg-Vulture Mine road, over good roads. Shipping point would be Wickenburg where the A T & S F Railroad has a station. Supply point would be Wickenburg, which is 54 miles from Phoenix on U. S. Highway 60 and 70. Residence point for the present will be Wickenburg.

4 (e) Manpower, materials, and supplies are all available from Wickenburg.

Water must be developed, but for the purposes of the exploration work proposed, will be trucked from the Vulture Mine where a well is available.

Power for the exploration work will be by engines connected to compressors, hoists, etc.

5 (a) Tungsten

5(b) We propose three separate projects to comprise the exploration work proposed. These are described below:

1. Bulldozing: A considerable area is covered with talus and gravel fill that overlays the ore bodies except along ridges or in creek bottoms. We feel that approximately 20 cuts with a D-8 or equivalent tractor and dozer will adequately expose the ore and permit closer study of the geology. Approximately 1200 linear feet of cut is contemplated.

   This loose cover is from 6 inches to 3 feet deep but presently makes exact delineation of the surface showings impossible. The southerly deposits are in veins in granite, decomposed on the surface, and would be well exposed by bulldozer trench.

   The areas marked as "A" and "B" on the plat are on rather steep hillside, but in places the ore indications are well covered by porphyry float and decomposed granite. Since surface indications of the ore are over rather extensive areas, only adequate trenching will accurately find their limits.

   Several well defined fissure veins cross the shear zone containing the ore enrichment, and it will be a simple matter to expose the veins by bulldozing.

   Also, we feel that considerable money and time can be saved by preparing an adit portal location at site "A" by use of the bulldozer. At site "B", where a shaft is proposed, a bulldozer will be necessary for preparation of the shaft collar and hoist locations.

   Proposed bulldozer work is indicated on the attached plat of the property.

2. Site "A", located on the Flying Saucer #4 claim is indicated on the Geological Map and shown in detail by sketch No. 1.

   Adjacent to this location are extensive showings of commercial ore in the porphyry and adjoining granites. We propose to drive an adit

from the convenient location indicated to cut first of all an east-west trending fissure vein showing values in tungsten and on into the parphyry dike, which apparently is the footwall of the ore body. This adit will be approximately 150 ft. in length. Then a crosscut will be driven to explore the parphyry dike and the granite adjoining which shows good surface indications of tungsten. This crosscut will be driven approximately 80 ft. intercepting and cutting the northwesterly trending shear zone which is tungsten enriched at the surface. A drift 75 ft. in length will be driven northwesterly along the strike of the shear zone to a point directly under the open cut shown on the map, for the purposes of exploring the formation showing good surface ore in place.

This plan gives us the maximum depth possible without shaft sinking and will explore at depths up to approximately 80 ft. the extensive surface ore.

3. Site B, located on the Flying Saucer claim can be located from the geological map; details are shown by sketch No. 2. Here the deposit comprises a northward trending zone carrying tungsten which extends approximately 260 ft. north and 150 ft. south of the discovery hole and seems to average approximately 100 ft. in width. The exact surface area cannot be determined until bulldozing exposes more of the in place surface, there being a shallow cover of float and decomposed granite over part of the area. We propose to enlarge and sink the discovery shaft to a working depth of 75 ft. From the bottom of this shaft a drift will be driven approximately 120 feet southwesternly to intercept a wide zone of granite which shows appreciable quantities of tungsten at the surface. We propose also to drive another drift northerly from the shaft bottom approximately 140 ft. to intercept the ore zones evident at the surface.

A tentative study of the area at Site B suggests that the various ore zones may possibly be selectively mined by open cut methods to a depth of approximately 75 ft. provided the zones exist to that depth. It is for the purpose of exploring these zones at some depth that we propose this exploration work.

It will be evident that the alternate method of exploring with core drills exists, since the surface indications are so extensive. Our choice of shaft and drift prospecting is based on our experienced and the advice of others, that tungsten ore bodies may possibly be lenticular and in shoots, so that drifting affords a continous exposure of the geology, permitting a more adequate study of structure and ore control.

We trust the above will outline our ideas clearly. The exploration plans will be subject to the good advice of your geologists , after their examination of the project, should they see fit to offer advice.

5 (d) One partner in this enterprise is Mr. H. G. Kinnon, who resides at 20 E. Catalina Drive in Phoenix. Mr. Kinnon attended the University of Nevada Mackay school of Mines, for three years ending in 1929 and is presently District Manager of the Southwestern area for Allis-Chalmers Mfg. Co., joining this company in 1937. During the interval of 1929-1937, Mr. Kinnon was associated with various mines in the southwest in various capacities from mine surveyor to manager.

The other partner, Mr. J. Frank Henderson, who resides at 1217 E. Weldon Ave., Phoenix, is a graduate of the University of Arizona, BS in EE, 1931. From 1932-1941 he worked with various mining companies attaining the position of Chief Electrician with the Fairbanks Exploration Co. in 1941. While at Fairbanks, he audited metallurgical and mining engineering courses at the University of Alaska and in 1943 began employment as Field Engineer and then Sales Engineer with The Dorr Co.

During the past five years both partners have been attempting to initiate a mining operation and most of their spare and vacation time has been spent in mine examination and sampling metallurgical testing, etc.

6 (a) EQUIPMENT CONTRACTS

Project 1. Bulldozing.

Several contractors have given us a price of $100.00 per day for contracting the services of a D-8 Bulldozer with 8 ft. blade. This price includes operator, moving in and out of the property, transportation for operator, all fuel, repairs, etc. We figure one day moving in, one day for return of equipment, and eighteen days work on the property or twenty days in all at $100.00/day = $2,000.

Project 2. Site A.

The Mines Development Co., Inc., of Wickenburg, Arizona, Mr. Ike Kunkle, President, has offered to contract all tunnel work for the following base prices. A 4' x 6' domed roof adit for $30.00 per linear foot. Timber where required, will be furnished at cost and labor for installation at $ 2.00 per man hour. The contractor will furnish his own compressed air and blowers, drilling equipment, drill steel, bits, piping, rails and ties installed, powder, caps, fuse, etc., including all items required for efficient mining plus transportation for all items and the haulage of water for mining operations.

With the bulldozer providing the portal site, we estimate that the 305 ft. tunnel proposed will cost:

Mining - 305 ft. @ $30.00	$9,150.00
Timber	750.00
Misc.	500.00
Total	$10,400.00

Project 3. Site B.

The Mines Development Co. has offered to contract the 75 ft. working depth

shaft on the following basis: A shaft 6' x 6' inside timbers, two compartment, for a unit price of $75.00 per linear foot. Shaft timber with 6" x 6" posts and 2 in. lagging at the rate of $6.00 per linear foot. The contractor will furnish hoist, rope, rope sheave, muck buckets, compressed air, piping, and all mining equipment including water, for these base prices.

Erection of headframe, Cutting out station at 75 ft. and all other labor required for other uses than sinking shaft or driving crosscuts will be furnished at the rate of $3.00 per man hour.

In addition the contractor will keep and provide a complete cost accounting kept current provide his own workmens compensation and employer's liability insurance.

We estimate the cost of this project as follows:

Headframe	$ 450.00
Shaft sinking, 80 ft. @ $75.00	6000.00
Timber & labor 50 ft. @ 60.00	300.00
Station at 75 ft. level	250.00
200 ft 6' x 6' drift @ 38.00	7600.00
Misc., etc.	750.00
Total	$15,430.00

Total cost of the 3 projects. $27,830.00

6 (b) Labor, Supervision, Consultants.

1. No labor outside of the unit contractors will be used.

2. Supervision of day to day operation by the Contractor. Supervision of the Contractor and responsibility for the work to the government by the owners. It is planned that one or both of the owners will be on the property a minimum of four (4) days per week, not including Saturday or Sunday. Travel will be charged for at the rate of 6¢ per mile and a charge made for board and room of $8.00 per day or $32.00 per week. For an estimated period of six months or 26 weeks, this is in the amount of:

Board and Room 32 x 26	$832.00
Travel 200 mi. per week @ 6¢ x 26 wks	312.00
Total	$1144.00

The owners will provide the required engineering services such as sampling, mapping, etc.

It is planned that at about the midpoint of the operation that a consulting geologist be retained for an examination to render a report for use by the government and the owners. This cost will be:

5 days @ $75.00 $375.00

6 (c) Operating Materials and Supplies.
None

6 (e) Rehabilitation and Repairs.

None

6 (f) New buildings, improvements, installations.

None

6 (g) Miscellaneous.

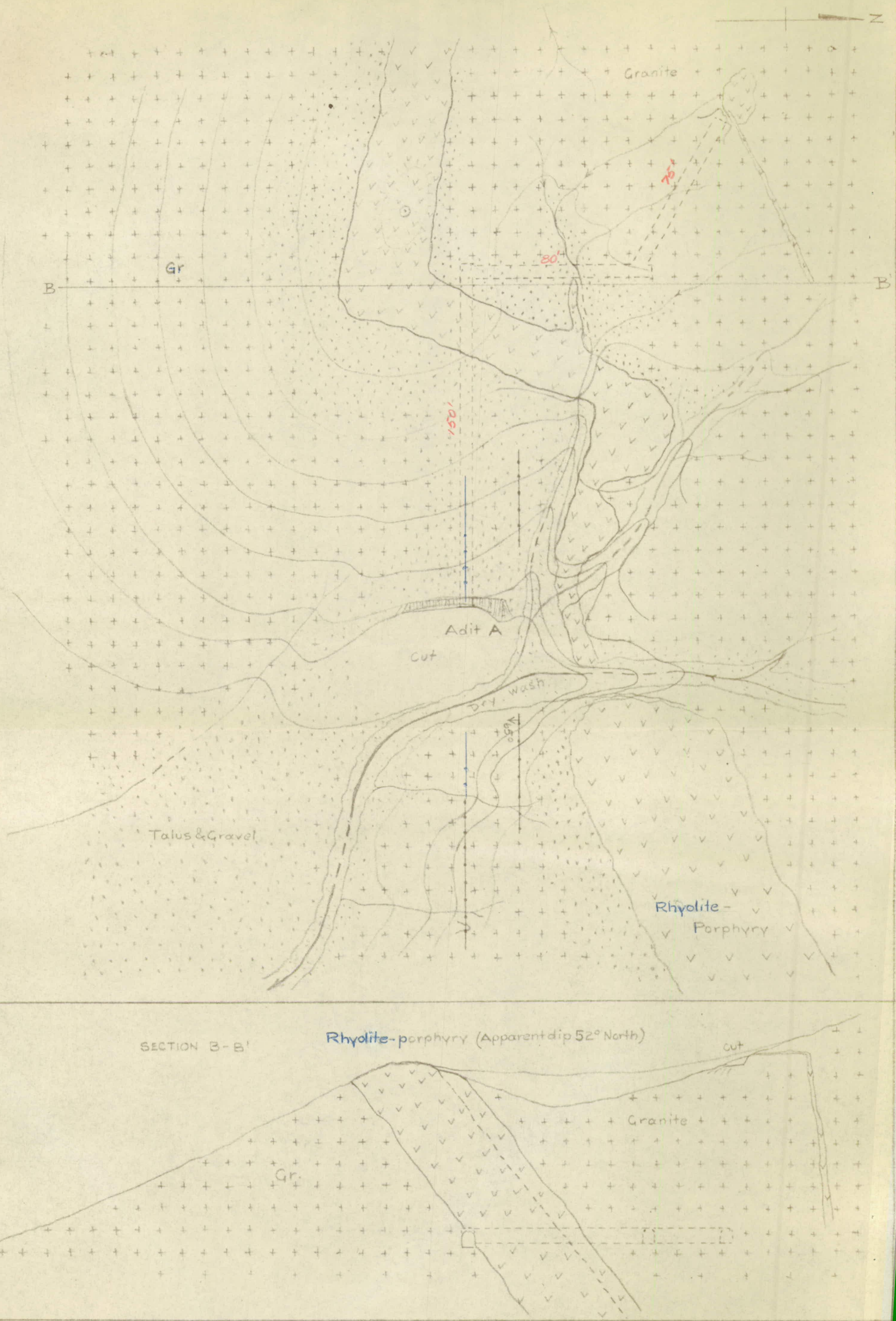
Assays: 150 @ $5.00	$750.00
Accounting	300.00
Total	$1,050.00

6 (h) Contingencies.

Total amount of projected expense as listed above is $30,399.00. This leaves an amount of $1,601.00 remaining from the estimated cost of the entire project of $32,000, or approximately 5% remaining for the contingency item.

7 (a) Yes

7 (b) The owners share of the expense will be 25% of the total minus the expense item detailed under 6 (b) or $8,000 - 1144.00 = $6,856.00. This amount will be available as cash under any arrangement desirable by the government.

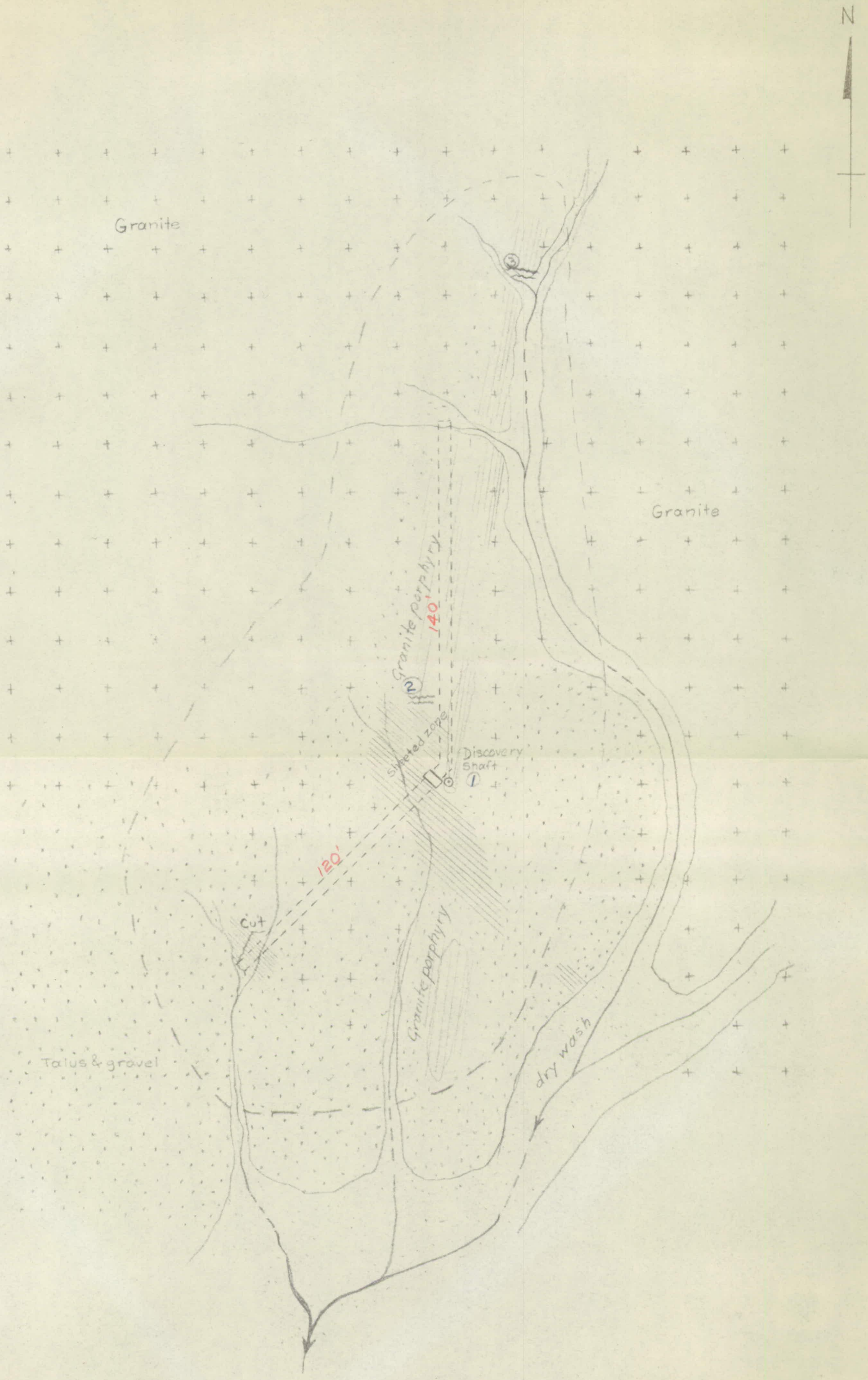


Scale 1" = 40'

PROJECT NO. 1 FLYING SAUCER CLAIM NO. 4

SKETCH NO. 1

SITE "A"

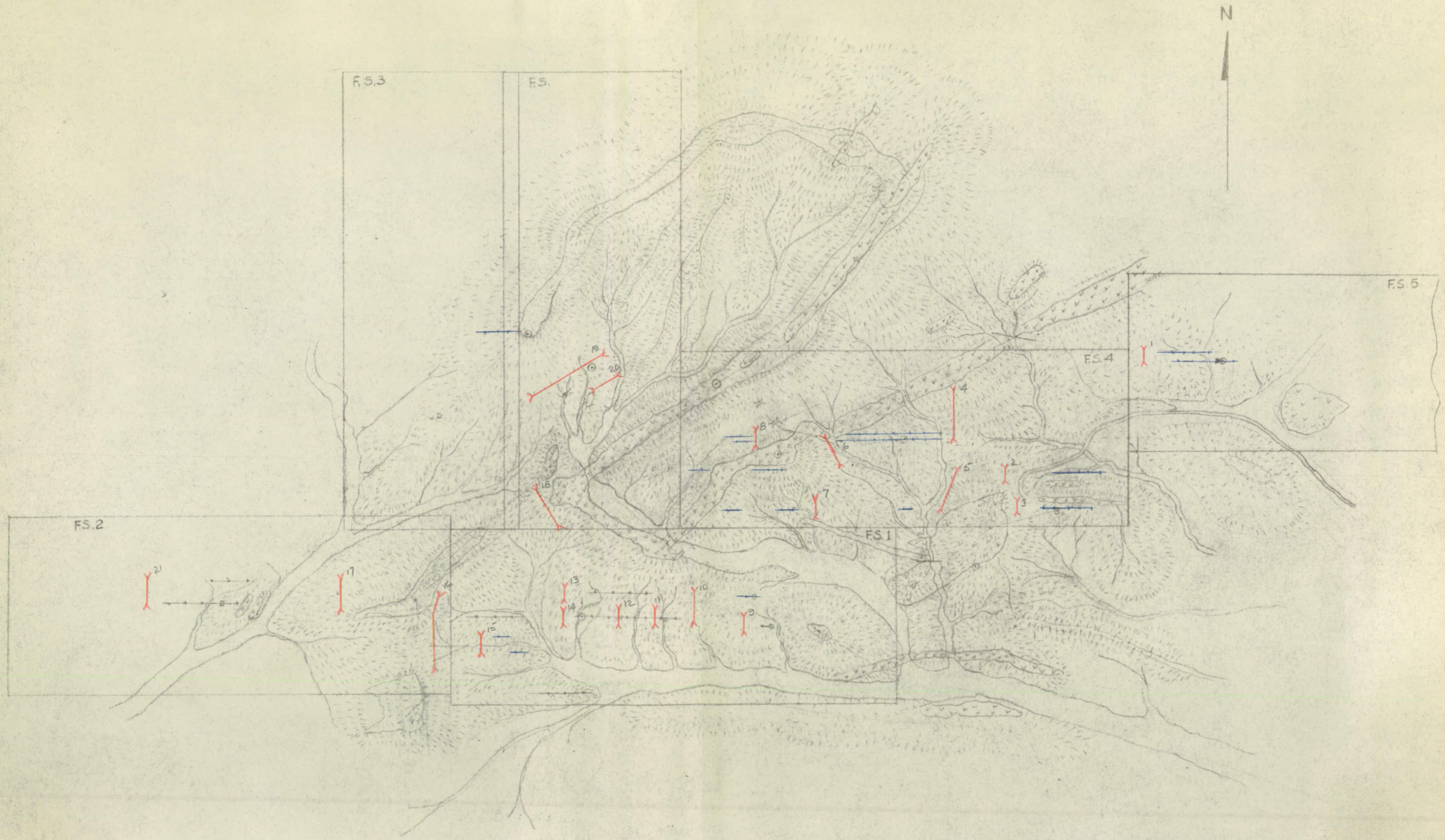


Scale 1" = 40'.

PROJECT No. 2 FLYING SAUCER CLAIM

SITE "B"

SKETCH NO 2.

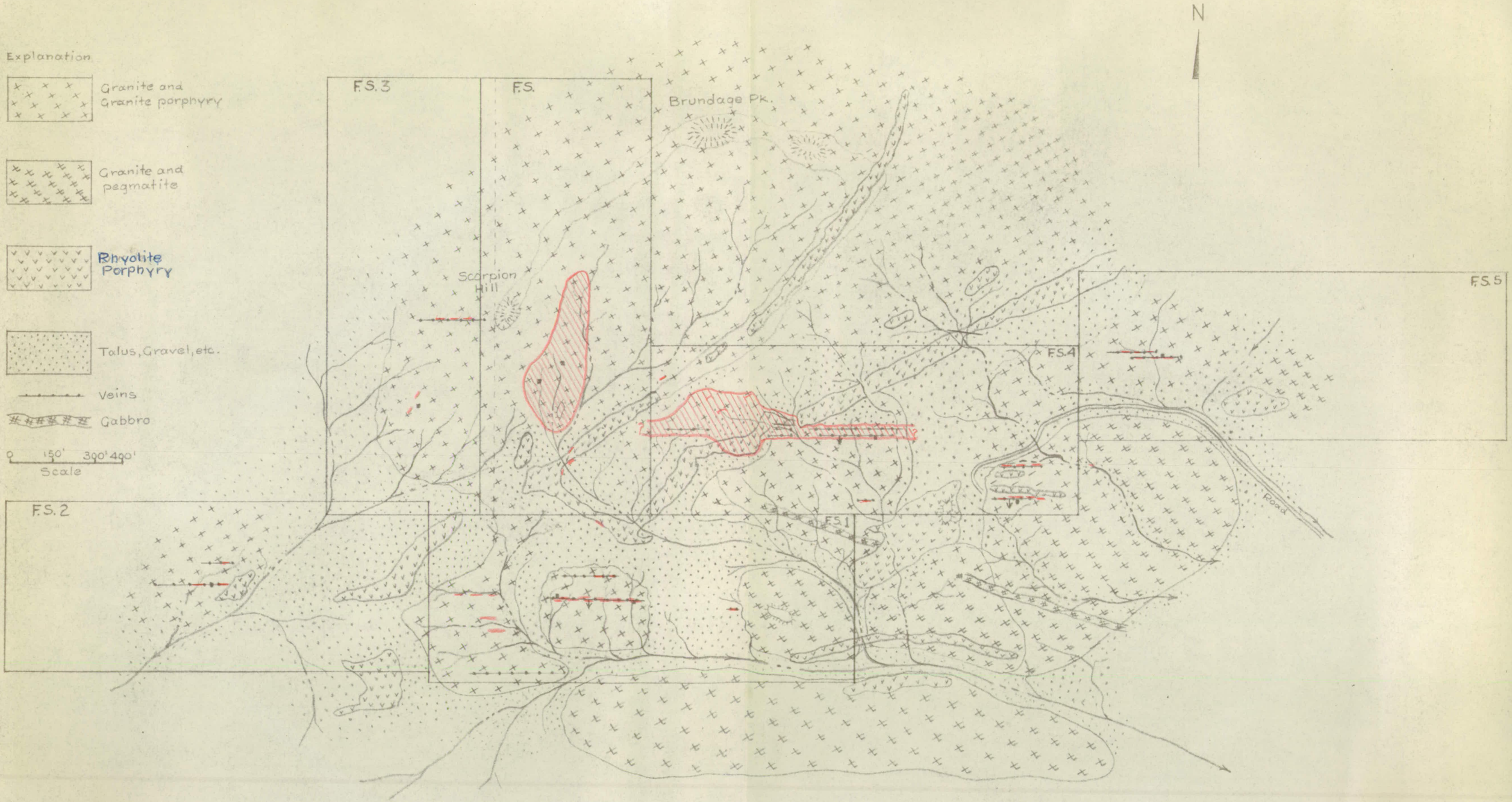


PLAT SHOWING FLYING SAUCER MINING CLAIMS

TOWNSHIP No. 6 NORTH, RANGE No. 6 WEST, SECTION 12.

Scale 1" = 300 feet.

W.K. 1-53



GENERAL GEOLOGIC MAP OF FLYING SAUCER CLAIMS AREA

WK
1-53

2889

May 11, 1953

MEMORANDUM

To: Administrator, DMEA

From: Iron and Ferro-Alloys Division, DMEA

Subject: Denial of application by Field Team, Region IV
Docket No. DMEA-2889 - Tungsten
J. F. Henderson and W. C. Kinnon
Flying Saucer Mine
Maricopa County, Arizona

The applicants requested exploration assistance in the amount of $32,000.00 to explore tungsten-bearing veins on the property of the Flying Saucer Mine, Maricopa County, Arizona.

The Flying Saucer mining property covers an area of medium-grained biotite granite, which has been invaded with later igneous rocks of varying types and in the nature of dikes. There is evidence of shearing and sheeting but not of great intensity. Except for small quartz veins and stringers, typical fissure vein structures are absent.

The tungsten mineralization consists of pseudomorphic and scheelite. The examination of the surface at night showed great areas of fluorescence which included granite and all dike rocks except a late basic dike.

Samples taken by the applicants at 5 different locations showed values of WO_3 ranging from 0.12% to 0.73% with an average of 0.49%. Samples from approximately the same locations by the Field Team showed - 0.01% to 0.20% WO_3.

The most reasonable explanation for the difference in the results obtained by the applicants and the examiners is in the accuracy of the assaying. However, it was believed that the assaying done by the Bureau of Mines was correct, as the pulps of three samples were checked closely by the Salt Lake City Laboratory of the Bureau of Mines.

After examining and sampling the areas of great fluorescence, the DMEA examiners concluded that the mining property does not warrant any kind of an underground exploration program. For this reason the Field Team, Region IV denied the application for exploration assistance Docket No. DMEA 2899.

We concur in the denial.

Sgd

W. S. Martin, Acting Chief
Iron and Ferro-Alloys Division

JHopkins:foc
5-11-53

cc: Docket
Code 400
Field Team, Reg. 4
Admr. Reading File

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

Pg 4
Denial

224 New Customhouse
Denver 2, Colorado

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
APR 30 1953

April 27, 1953.

Memorandum

To: Administrator, Defense Minerals Exploration Administration
Attention: 200

From: Field Team, Region IV

Subject: Final Report, DMEA Docket 2889 (Tungsten), J. Frank Henderson and W. C. Kinnon, Flying Saucer Mine, Maricopa County, Arizona.

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

W. H. King
W. H. King

for Ogden Tweto
A. H. Koschmann

Enclosures

Return to
400 for file

Reviewed by
DMEA OPERATING COMMITTEE
5-4-53
(date)

400

C O P Y

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

224 New Customhouse
Denver 2, Colorado

April 27, 1953.

Mr. J. Frank Henderson
1317 E. Weldon Avenue
Phoenix, Arizona

Mr. William C. Kinnon
28 E. Catalina Drive
Phoenix, Arizona

Re: Docket DMEA-2889

Gentlemen:

Reference is made to your application for Government aid on the Flying Saucer Tungsten Mine.

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

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

Very truly yours,

Sgd. W. H. King
Field Team, Region IV

Sgd. Ogden Tweeto
for A. H. Koschmann
Field Team, Region IV

HMC: cwm

cc: Administrator, DMEA
WRStorms
RFRobinson
AHKoschmann (2)
Subject
Chron.

Performed by
DMEA [illegible]
5-4-53
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

400

Mining Division
Region IV

April 27, 1953.

Memorandum

To: Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: Final Report, DMEA Docket 2569 (Tungsten), J. F. Henderson and W. C. Kinnon, Flying Saucer Mine, Maricopa County, Arizona.

Enclosed are nine copies of the final engineering report on the subject docket. The Geological Survey did not participate in the field examination.

The examiners sampled the property and had check assays made. The average of all of the eight samples taken by the examiners was 0.06% WO_3, which is approximately one-tenth of the grade that the applicants believe they can mine.

The examiners recommend denial of the loan based on the extremely low values contained in the deposit.

We concur in this recommendation.

W. H. King
W. H. King

Enclosures

Reviewed by
DMEA OPERATING COMMITTEE
5-4-53
(date)

MINING DIVISION
REGION IV

April 20, 1953

Memorandum

To : W. H. King, Chief, Mining Division, Region IV

From : Chief, Mining Methods Branch, Mining Div., Region IV

Subject : Final Report, Docket DMEA-2889, Flying Saucer Tungsten Prospect, Vulture Mining District, Maricopa County, Ariz.

Enclosed are original and 8 copies of a report on the above property by M. J. Elsing and W. R. Hardwick of the Bureau of Mines. As the Geological Survey did not participate in this examination, a separate report on Geology will not be submitted.

A considerable area on the property showed marked fluorescence at night under ultra-violet light, but analysis of several samples taken by the DMEA examiners from the best-appearing zones showed only 0.05 to 0.06 percent WO_3. As no evidence was noted to warrant the belief that exploration of any kind would develop ore of a higher grade, the examiners recommended that an exploration loan be denied. I concur with their recommendation.

Brochure is enclosed.

Walter R. Storms

Walter R. Storms

CC: W. H. King (8)
R. F. Robinson
DMEA-2889
DF

WRStorms:als

Reviewed by
DMEA OPERATING COMMITTEE
5-6-53
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA-2889, Flying Saucer Tungsten Prospect

Vulture Mining District, Maricopa County, Arizona

M. J. Elsing, Consulting Mining Engineer
U. S. Bureau of Mines

W. H. Hardwick, Mining Engineer
U. S. Bureau of Mines

April 1953

Reviewed by
DMEA OPERATING COMMITTEE
5-4-53
(date)

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By M. J. Elsing[1] and W. R. Hardwick[2]

On February 11, 1953, the Executive Officer, Field Team, Region IV, of the Defense Minerals Exploration Administration requested that an examination and report on the feasibility of an exploration project costing $30,399 be made on the Flying Saucer tungsten prospect, Vulture Mining District, Maricopa County, Arizona. The applicants and owners are J. Frank Henderson and W. C. Kinnon. The application is known as Docket DMEA-2889.

On March 16-18, 1953, M. J. Elsing and W. R. Hardwick visited the property and examined the various surface showings and shallow excavations. Samples were taken from representative places. The property was re-examined at night with ultra-violet ray lamps and some additional sampling was done.

The property is 11 miles southwest of Wickenburg and is favorably located in some rolling hills a few miles northwest of the old Vulture mine.

The country rock is a decomposed and altered granite which has been intruded by various igneous dike rocks. Examined at night with ultra-violet ray lamps the surface shows an exceptionally brilliant fluorescence which has a tendency to be yellow rather than white, possible indicating the presence of powellite. The fluorescence is confined to no particular formation and usually does not occur in veins. One area on Scorpion Hill showed brilliant fluorescence over an area some 200 by 400 feet in size. A second area of lesser size occurs about 700 feet to the east. There are smaller areas of strong, but less brilliant fluorescence on many parts of the claims.

1/ Consulting Mining Engineer, U. S. Bureau of Mines
2/ Mining Engineer, U. S. Bureau of Mines

The applicants have provided the assays of [illegible] samples. On the basis of these samples they believe that there are large sections from which ore can be produced from open cuts and from underground operations that will average 0.5 to 0.[illegible] percent WO_3.

The DMEA examiners took 8 samples, 5 of which were a direct check of the sampling done by the applicants. The 5 samples taken by the applicants averaged 0.49 percent WO_3, whereas the samples taken by the DMEA examiners from these same places averaged less than 0.07 percent WO_3. The average of all 8 samples taken by the examiners was 0.0[illegible] percent WO_3, which is approximately one-tenth of the grade that the applicants believe they can mine.

In order to be doubly certain of the correctness of the assaying, pulp from 3 of the samples taken by the DMEA examiners was sent to the Salt Lake City laboratories of the Bureau of Mines for check assaying. The checks were exceedingly close and it is believed that all of the assaying as reported by the DMEA examiners can be accepted. The method of sampling this ore deposit cannot account for the difference in values since sampling this deposit is not difficult. Most of the material is soft and more or less uniformly mineralized. It is believed that the difference in the values obtained most likely is due to faulty assaying on the part of the applicants' assayers.

The examiners sampled areas of the most intense fluorescence and there is no evidence to warrant the belief that ore of anywhere near a profitable grade can be developed for the operation of a small flotation mill. Sampling also indicates that there is very little change

that a large low-grade deposit, subject to mining by open-pit methods on a large scale, can be developed for profitable operation at the present market price of tungsten.

Because of these reasons, it is recommended that the request made by Henderson and Kinnon for a loan for the exploration of their Fijian saucer prospect be denied.

[illegible]-139, FLYING SAUCER TRAIL [illegible]
[illegible] MINE DISTRICT, [illegible], [illegible]

Engineering Report

By M. J. Slaine,
Consulting Mining Engineer
U. S. Bureau of Mines

W. R. Hardwick,
Mining Engineer
U. S. Bureau of Mines

April 1953

Reviewed by
DMEA OPERATING COMMITTEE
5-6-53
(date)

DMA-2339, FLYING SAUCER TUNGSTEN PROSPECT
VULTURE MINING DISTRICT, MARICOPA COUNTY, ARIZONA

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Engineering report — Page

Introduction 1
Acknowledgments 1
Location, topography and physical features. 2
History and production 2
Ownership and extent 2
Description of the deposits 3
Minable ore reserves 4
Present status 5
Project proposals 5
Production plan 10
Summary: Costs of project 14
Proposed financing 17
Conclusions 17
Recommendations 19

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Figure — Following page

1 Location map 2
2 Geological map 3
3 Project No. 2, Site A 5
4 Project No. 3, Site B 5

INTRODUCTION

On February 11, 1953, the Executive Officer, Field Team, Region [illegible], of the Defense Minerals Exploration Administration requested that an examination and report on the feasibility of an exploration project costing $30,399 be made on the Flying Saucer tungsten prospect, Vulture Mining District, Maricopa County, Arizona. The applicants and owners are J. Frank Anderson and W. F. Kinnon. The application is known as Docket [illegible]-2139.

On March [illegible]-[illegible], 1953, [illegible] and [illegible] visited the property, examined the various surface showings, and the shallow excavations. Samples were taken from representative places. The property was re-examined at night with ultra-violet ray lamps and some additional sampling was done.

ACKNOWLEDGMENTS

Acknowledgments are due J. Frank Anderson and W. F. Kinnon, who are the owners and also the applicants. Anderson is presently Sales Engineer with the Kerr Company, and Kinnon is District Manager of the Southwestern area for Allis-Chalmers Manufacturing Company. Anderson received a degree as an electrical engineer from the University of Arizona in 1931 and since that date has been specializing in metallurgy. Kinnon is a mining engineer and practiced his profession from 1908 to 1937, when he joined Allis-Chalmers. Both of these men accompanied the examiners over the property. They are keen, practical, business men and have the operators' point of view. Many of their opinions relative to the flotation of scheelite and powellite ores, and the subsequent chemical treatment of the concentrates were of interest.

LOCATION, ACCESS AND PHYSICAL FEATURES

The Flying Saucer Deposit is situated in the Vulture Mining District, Maricopa County, Ariz. in Sec. [illegible], T. [illegible], R. [illegible] (see figure 1).

The property is reached from Wickenburg by following the Wickenburg-Vulture mine road for a distance of 10 miles southwest from Wickenburg. The Vulture road is left at this point by making a turn to the right, or to the west, and the Flying Saucer mine road is followed for 1 mile to the easterly edge of the property.

The topography is of the rolling hills variety without steep gradients. Small shallow washes drain the area both to the east and to the west. The vegetation is of the semi-arid variety and includes mesquite, palo verde, cacti, and small shrubs.

HISTORY AND OWNERSHIP

Anderson and Kinnon located the six Flying Saucer claims between July 1952 and February 1953. Except for a small amount of trenching the discovery shafts are the only work on these claims. There has been no production from the property.

CLAIMS AND TITLE

Anderson and Kinnon hold 6 lode mining claims by location, the docket and page number of which are recorded in the office of the County Recorder of Maricopa County, Phoenix, Ariz. as follows:

Name of Claim	Docket No.	Page No.
Flying Saucer	1049	[illegible]
Flying Saucer No. 1	1049	[illegible]
Flying Saucer No. 2	1049	[illegible]
Flying Saucer No. 3	1049	[illegible]
Flying Saucer No. 4	1049	[illegible]
Flying Saucer No. 5	Not recorded to date.	

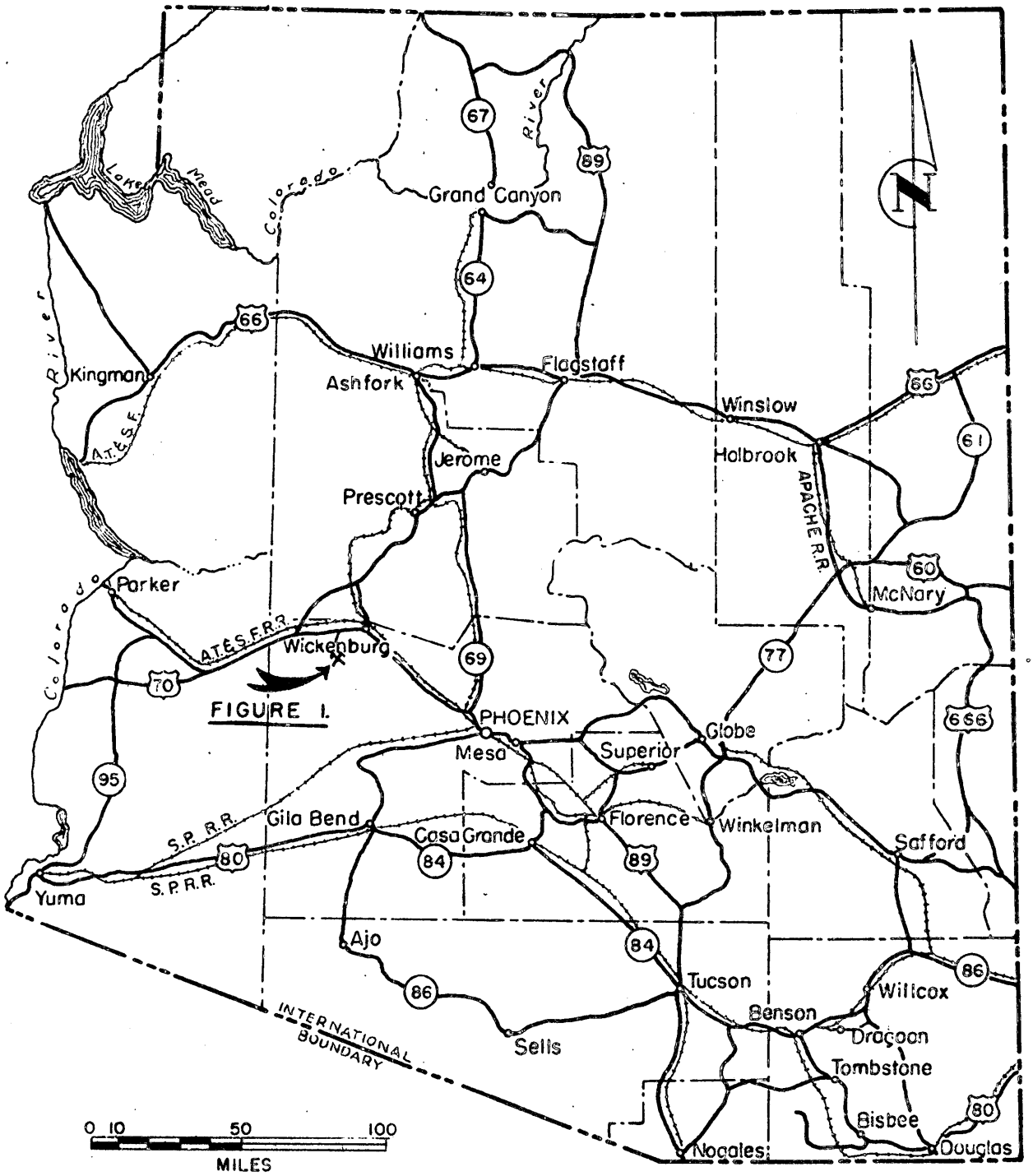

FIGURE 1. - LOCATION MAP

FLYING SAUCER CLAIMS AREA - DMEA 2889

VULTURE MINING DISTRICT MARICOPA COUNTY, ARIZONA

GEOLOGY OF THE AREA

The Flying Saucer group covers an area of medium- grained biotite granite (see figure 2). A number of intrusive rocks have intruded the granite. These include several kinds of porphyries, some pegmatites, and a basic intrusive. These dikes are irregular in shape and size. In the Flying Saucer and the Flying Saucer No. 4 claims there is a dike which roughly has the form of a large U. The two sides of this U-shaped dike are some 400 feet apart and more than 1,000 feet long. The dike is 50 to 75 feet wide and in places is very irregular in form. There are other fairly large dikes but they do not have any particular trend or pattern. In some places they are present in finger-like forms and occasionally they are quite small. In some places the granite is fine grained and has been largely replaced by quartz veining. In a few places there are quartz veins of short lengths and narrow widths. There is evidence of shearing and shearing but not of great intensity. Except for small quartz veins and stringers, typical veins with definite walls and foot-walls are absent.

The tungsten mineralization consists of powellite and scheelite. The deposition of these minerals has not been particular to any kind of rock formation. The examination of the surface at night showed great areas of brilliant fluorescence which included granite and all the dike rocks, except a late basic dike. In crossing from one formation to another there is no visible change in the amount, character, and intensity of the fluorescence. It seems that each rock is as welcome a host as the next one. Powellite is more abundant than scheelite, but as far as could be seen there is no relation between the two minerals and the host rock.

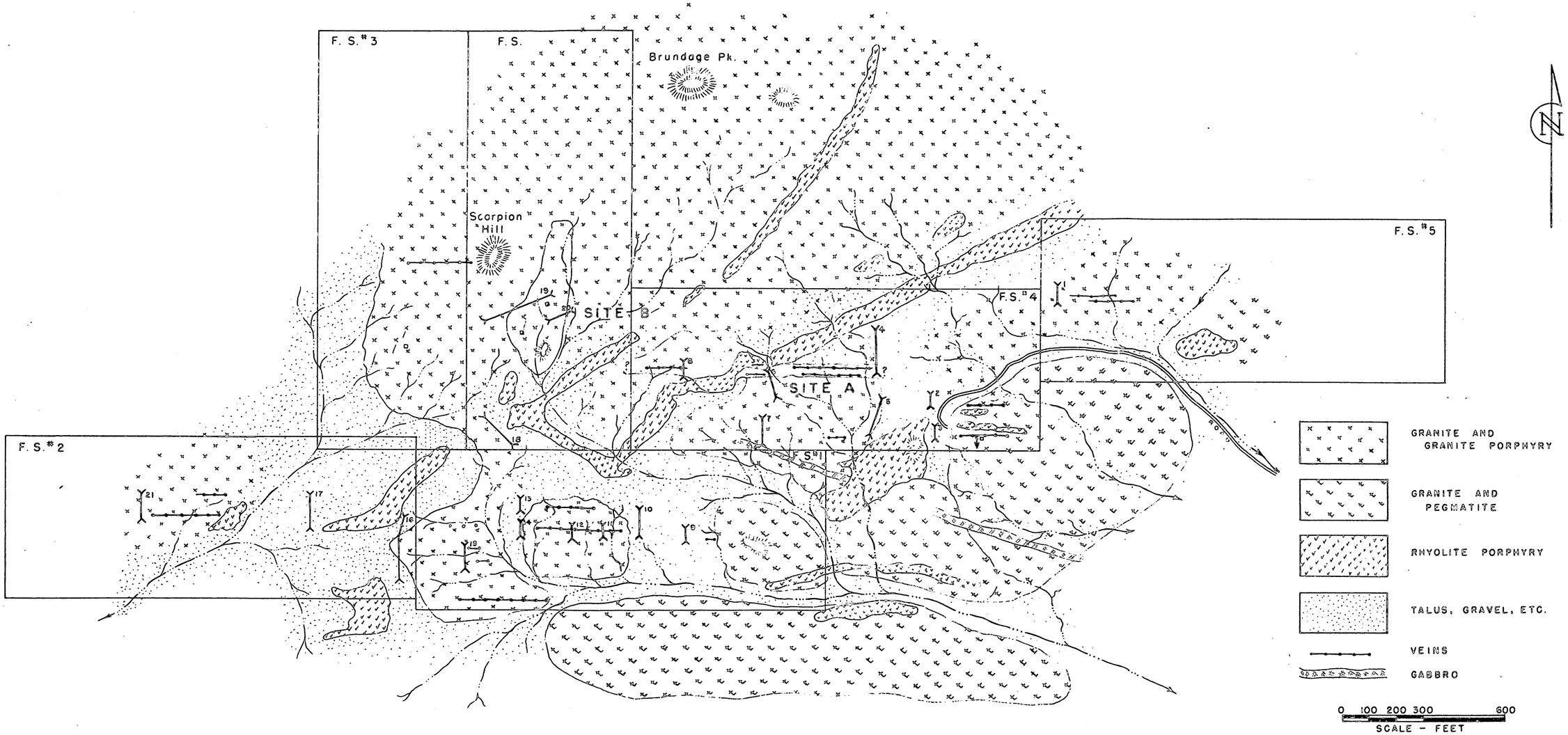

FIGURE 2. - GENERAL GEOLOGIC MAP OF FLYING SAUCER CLAIMS AREA (BY APPLICANT) SHOWING TRENCHES PROPOSED BY APPLICANT (PART I) - DMEA 2889

On Scorpion Hill the applicant has mapped one area of intense fluorescence that is 400 feet long with a maximum width of nearly 400 feet. This was the most interesting area because it represents a potential production of considerable size. For this reason it was sampled. The section mapped by the applicants by no means is the limit of the mineralized area. It might well include the entire area of Scorpion Hill.

A second large mineralized area occurs in the western half of the claim, Flying Saucer No. 4. There are scores of other showings of lesser size on the other claims of the group.

Most of the powellite and scheelite occurs as a dissemination through the rock in which it occurs. The most brilliant fluorescence occurs in roughly rounded forms from the size of a pin's head up to marble size. Streaks, stringers, and veinlets are largely absent. Powellite occurs in this form in the soft decomposed granite or the harder igneous dikes. Without the ultra-violet ray lamp it is impossible to recognize either the powellite or scheelite.

The most puzzling characteristics of this mineralization are the low WO_3 content for such brilliant fluorescence, and the impossibility of identifying the structural controls which limit its extent.

ORE RESERVES

The property has no exploration or development of any kind and the character of the occurrence of powellite and scheelite is such that it is impossible to estimate ore reserves in any category. Sampling indicated that the brilliance and amount of fluorescence are no criteria of the WO_3 content of the material.

[illegible] samples were taken from various parts of the property. Five of these samples were taken from identical, or almost identical locations which previously had been sampled by the applicants. The location of each sample is shown on figures 3 and 4, and is described as follows:

Sample No. 1:

Across 4 feet of decomposed granite, including a 4-inch quartz stringer, across the small gulch from applicant's proposed "dump".

[illegible] assay: less than 0.01 percent Ag.

Applicant's assay: 0.73 percent.

Sample No. 2:

Channel sample along 15 feet of a shallow trench, 100 feet southwest of location shaft on Flying Saucer claim, Scorpion Hill.

[illegible] assay: less than 0.01 percent Ag.

Applicant's assay: 0.45 percent.

Sample No. 3:

General grab sample of dump of shallow pit described under sample No. 2.

[illegible] Tucson assay: less than 0.01 percent Ag.

[illegible] Salt Lake City assay: 0.04 percent.

Applicant's assay: 0.45 percent.

Sample No. 4:

Grab sample of dump from location pit, or discovery shaft on Flying Saucer claim, Scorpion Hill.

[illegible] Tucson assay: 0.01 percent Ag.

[illegible] Salt Lake City assay: 0.10 percent

Applicant's assay: 0.41 percent.

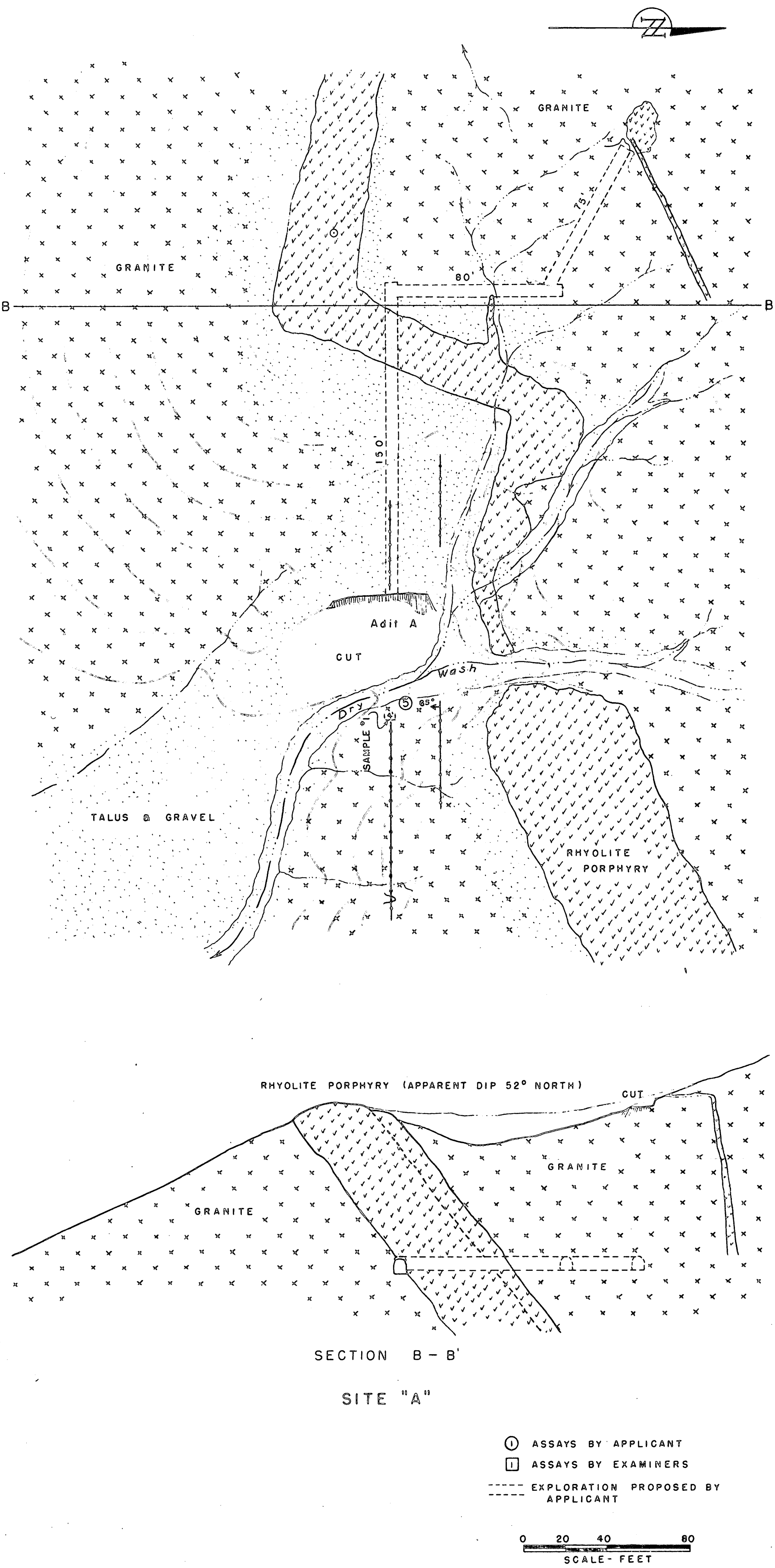

FIGURE 3. - PROJECT NO. 2, FLYING SAUCER CLAIM NO. 4 - DMEA 2889

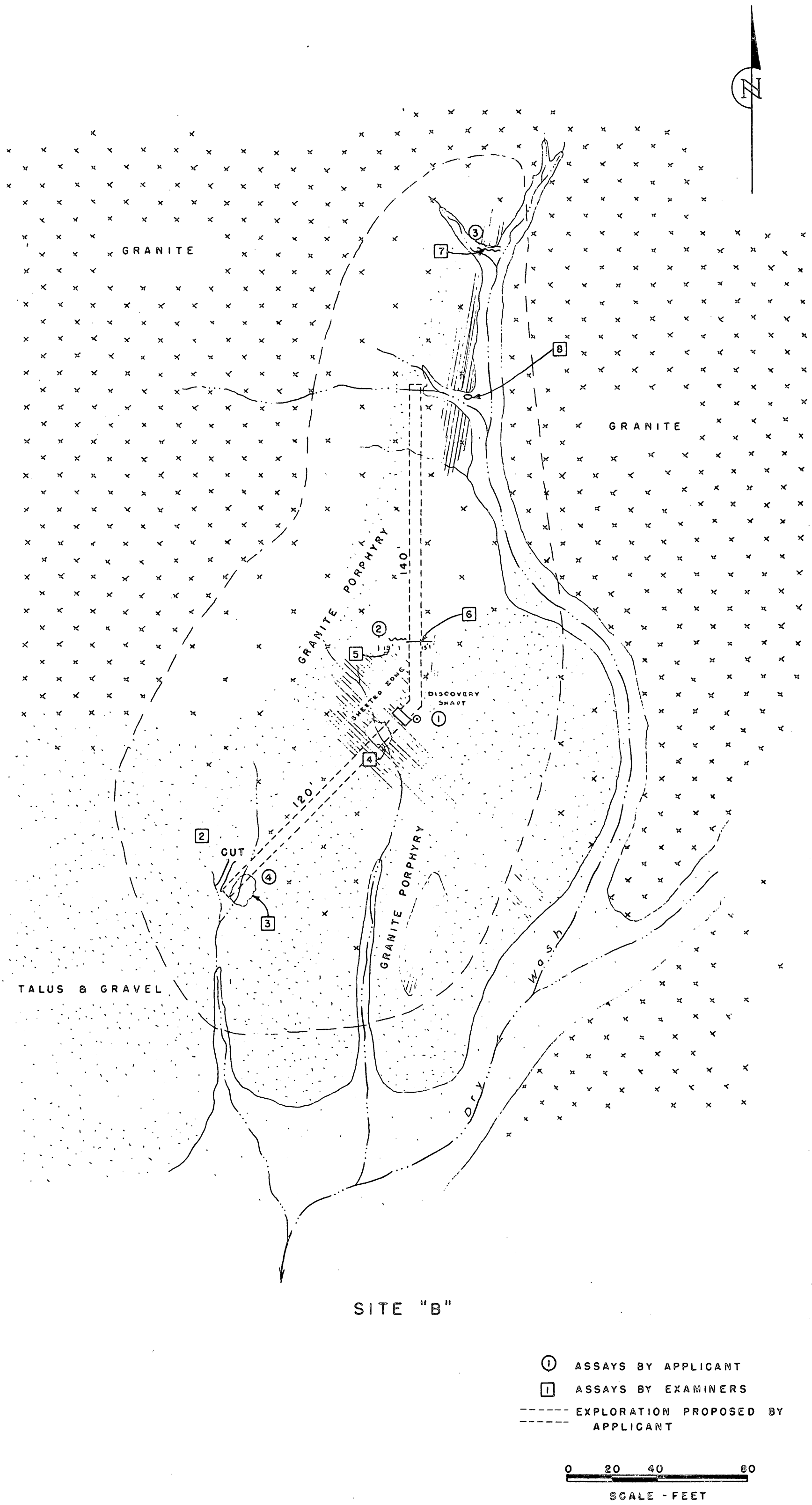

FIGURE 4 - PROJECT NO. 3, FLYING SAUCER CLAIM - DMEA 2889

Sample No. 3

Channel sample along 10 feet of a trench, 30 feet north of discovery shaft on Flying Saucer claim, Scorpion Hill.

Mr. Tucson assay: 0.20 percent Au.

Mr. Salt Lake City assay: 0.22 percent.

Applicant's assay: 0.13 percent.

Sample No. 4

Grab sample along a 15-foot extension to the east of sample No. 3, showed considerable fluorescence but not as much as sample No. 3.

Mr. Assay: 0.10 percent Au.

Sample No. 5

Channel sample across 10 feet of sheared granite, 210 feet north of discovery shaft on Flying Saucer claim, Scorpion Hill. A brilliantly fluorescent area.

Mr. Assay: 0.20 percent Au.

Applicant's assay: 0.15 percent.

Sample No. 6

Channel sample across 5.0 feet of sheared granite, 145 feet north of discovery shaft on Flying Saucer claim, Scorpion Hill. Supposed to be 15% grade ore.

Mr. Assay: 0.02 percent Au.

The applicants' sample No. 1 was taken from the perimeter of the discovery shaft on the Flying Saucer claim. This sample assayed 0.21 percent Au and should roughly check the U.S. examiners' sample No. 4, which was a grab sample of the dump from the discovery shaft. The assay of No. 4 was 0.20 percent Au.

The applicants' sample No. 2 was from the trench 30 feet north of the discovery shaft on the Flying Saucer claim. It assayed 0.03 percent WO_3 and should check with the examiners' Sample No. 5 which assayed 0.20 percent WO_3.

The applicants' sample No. 3, assaying 0.43 percent WO_3, and the examiners' sample No. 7, assaying 0.06 percent WO_3 are from approximately the same place.

The applicants' sample No. 4, assaying 0.45 percent WO_3, and the examiners' samples Nos. 2 and 3, each of which assayed less than 0.01 percent WO_3 are from approximately the same place.

The applicants' sample No. 5, assaying 0.73 percent, is from the same location as the examiners' sample No. 1 which assayed less than 0.01 percent WO_3.

A tabulated comparison of these assays is shown below:

Samples from approximately the same locations

Taken by		Percent WO_3	
Applicants	Examiners	Applicants	Examiners
No. 1	No. 4	0.21	0.01
No. 2	No. 5	.03	.20
No. 3	No. 7	.43	.06
No. 4	Nos. 2 & 3	.45	-.01
No. 5	No. 1	.73	-.01
	Average	0.49	0.07

The most reasonable explanation for the difference in the results obtained by the applicants and the examiners is in the accuracy of the assaying. It was believed that the assaying done by the Bureau of Mines was correct. On the other hand, the applicants are very competent and experienced engineers and have had great mining and metallurgical experience. They are fully aware of the difficulty of assaying low-grade

tungsten ore. In order to make absolutely certain that the Bureau of Mines original assaying was correct, the examiners sent the pulps of three samples to the Salt Lake City Laboratory of the Bureau of Mines to be check assayed. The check assaying confirmed the opinion that the original WO3 assaying was correct. The results are as follows:

Percent WO_3		
Original Assays		Check Assays
Applicant	Examiners	Examiners
0.45	0.01	0.04
.21	.03	0.10
.23	.20	0.22

PRESENT STATUS

Exploration and Development

The property has no exploration or development work. The only work of importance is a discovery, or location pit on each of the claims comprising the group.

Mining and Milling Equipment

The property has no equipment of any description.

PROJECT PROPOSALS

The applicants have proposed an exploration plan that includes three parts as follows:

Project 1. Bulldozing (figure 2).

There are from 6 inches to 3 feet of talus covering parts of the surface and the applicants believe it is necessary to remove this talus in cuts in order to better delineate the limits of the mineral showings. To accomplish this they propose to make 21 trenches or cuts across various showings from claim No. 5 to claim No. 2, a distance of 3,500 feet. The

approximate length of these cuts is 1,200 linear feet. They also wish to level off a tunnel site and a shaft site with the bulldozer.

A D-8 bulldozer can be contracted for at $100 per day. The applicants believe that it will take one day to move in and one day to move out and that bulldozing can be done in 18 days. The total cost of this part of the project will be $2,000.

Project 2. Tunnelling (figure 3, Site A).

The applicants propose to drive an adit 150 feet long, then from this adit drive a crosscut and a drift for 155 feet, making a total of 305 feet. No part of this tunnelling will attain a depth below the surface of more than 75 to 80 feet and most of it will be considerably less. The total cost of this work will be $10,400.

Project 3. Shaft sinking and drifting (figure 4, Site B).

The applicant proposes to enlarge the present discovery shaft on the Flying Saucer claim and sink it to a depth of 75 feet, then from the bottom drive 120 feet southwest and 140 feet due north. The drift to the southwest will have a depth below the surface of approximately 75 feet for its entire length but the drift to the north will gain some additional depth. The proposed shaft sinking and drifting will cost $15,400.

A detailed breakdown of the cost of the project is as follows:

Project 1.	Bulldozing		$ 2,000
Project 2.	Tunnelling Site A		
	Tunnelling, 305 ft. @ $30	9,150	
	Timber	750	
	Miscellaneous	500	10,400

Project 3. Shaft sinking and drifting		
Headframe	$ 450	
Shaft sinking, 80 ft. @ $75	6,000	
Timber & labor, 30 ft. @ $6	180	
Station at 75 ft. level	250	
400 ft., 4' x 6' drift @ $30	7,000	
Miscellaneous	750	$15,430
Labor, supervision, consultants		
Supervision		
Board and room ($8.00 per day, 4 days per week for 30 weeks)	$ 832	
Travel, 200 mi. per week @ 6¢, 26 weeks	312	1,144
Consultant's examination, 5 days @ $75.00		375
Miscellaneous		
Assaying, 150 assays @ $5	$ 750	
Accounting	300	1,050
Contingencies		1,001
	Total	$20,000

PRODUCTION PLAN

Time Schedule for Completion of Project

The applicants anticipate that the exploration project which they propose can be completed in 26 weeks.

Rate of Production

The applicants anticipate the rate of operation after the installation of a 50-ton flotation mill will be 50 tons per day of ore having an average content of 0.5 percent WO_3. On the basis of an over-all recovery of 79 percent (mill recovery 85 percent, chemical recovery 93 percent) and operating the mill for 25 days per month, 10,463 pounds of WO_3 will be produced per month.

Mining Methods and Costs

Since no ore reserves have been developed it is difficult to predict the method of mining and costs. The applicants anticipate production will come from a tunnel level at Site A and from a 75-foot shaft and drifts at Site B. On the basis of any presently available information it would be unwise to estimate that the present day underground mining cost would be less than $7.50 per ton on the basis of a production of 50 tons per day from substantially large ore bodies.

Milling Methods and Costs

Kinnon provided the following information relative to the treatment of ore that might be found at the Flying Saucer mine. "Preliminary laboratory tests on several samples of the ore indicates that flotation will recover between 90 and 95 percent of the scheelite and powellite in a bulk concentrate. Stage crushing and screening to produce minimum slimes would be used in conjunction with grinding in a rid mill 1/ to prepare the flotation feed. The flotation tailings would be put over tables to check the efficiency of the flotation work and recover any free gold in the pulp.

"From the present laboratory work we estimate the concentrate will carry 15 to 25 percent WO_3 and 10 to 20 percent MoO_3. The ore is remarkably free of calcite which is responsible for the relatively high grade WO_3 content indicated in the flotation concentrate.

1/ Rid mill should read rod mill.

"From the spectrographic analysis of the concentrate there is no sulphur, phosphorus, arsenic, or bismuth. Minor quantities of manganese, copper, chromium and titanium were detected together with some iron, alumina and silica.

"Chemical treatment of the bulk concentrate would consist of the pressure reactor process using dilute soda ash solution and finely ground concentrate under elevated pressure and temperature. This would be carried out in small batch autoclaves in which the tungsten is converted into soluble sodium tungstate and the molybdenum dissolved similarly, while copper, lead and silica remain in the residue. After filtering, the filtrate would be treated with calcium chloride which precipitates $CaWO_4$, the synthetic scheelite. Ammonium paratungstate solution (a saleable product) could be produced by precipitating the sodium tungstate solution with HCl plus HNO_3 and dissolving the H_2WO_4 precipitate in ammonia. The solution is then evaporated and the crystallised product dried and sacked.

"The pressure chemical treatment of powellite-bearing tungsten concentrates is not new. Several batch reactors and continuous digester plants are in steady operation in the U.S. The synthetic scheelite produced contains between 60% and 65% WO_3 and usually demands premium price on the market.

"To start with we would figure on a flotation concentrator to treat 50 T of ore per 24 hours using a selective mining system to maintain a mill head of .5% to .6% WO_3. We estimate a plant of this size would cost about $35,000. The chemical plant would have a capacity of 1 ton (2,000 lbs.) per day of bulk concentrates. The cost is estimated at about $22,000.

"The better recovery effected by flotation of 10 to 15% will pay most if not all the cost of chemical treatment of the concentrates.

"Besides the highly desirable synthetic scheelite or ammonium paratungstate the molybdenum would be recovered as a valuable by-product".

Laboratory table tests were made by the applicants on the following samples:

No. 1. Banded ore from Scorpion.

No. 4. Granite from Scorpion.

No. 5. Site "A" (vein and granite walls).

No. 6. South vein.

The results are tabulated as follows:

Laboratory Table Tests - Flying Saucer

Sample No.	Wt. Feed	Wt. Conc't.	% Wt. Conc't.	% WO_3 Conc't.	Est. % Recovery	% WO_3 Feed	% MoO_3 Conc't
1	2,200	19	0.865	27.16	50	.468	5.91
4	1,852	13	0.700	32.06	50	.448	7.27
5	1,639	19	1.100	37.53	50	.726	2.80
6	1,183	42	3.55	12.56	50	.892	34.15

Kinnon's estimate that a 50-ton flotation mill will cost $35,000 seems low, particularly if it includes power and the development of water. In all probability with water and power the cost will be at least $75,000. The discussion of the cost of a mill at this time is academic as the important consideration is whether or not sufficient profitable ore can be developed.

ctr e . . Longvenre, metallurgist for the Arizona Bureau of Mines, was consulted in regard to tests he was reported to have made on Flying Saucer ore. These tests to date were of a preliminary nature without assays and therefore contributed nothing of value. However provided some valuable general information regarding metallurgical recoveries and chemical losses in the treatment of scheelite ore. The average recovery in gravity mills is 60 percent. With a combination of gravity and flotation, recoveries average from 80 to 90 percent. The chemical treatment of concentrates results in an average recovery of 93 percent of the WO_3 contained. The cost of the chemical treatment of scheelite concentrates ranges between $12 to $15 per unit of WO_3.

SUMMARY COST OF PROJECT

Capital Requirements, Including Development

If sufficient ore is developed at the Flying Saucer to warrant the construction of a 50-ton concentrator and a batch chemical treatment plant, the necessary capital investment would be on the order of $175,000. This is broken down as follows:

Mine plant	$35,000
Mine development	25,000
Flotation mill incl. water.	75,000
Chemical plant	30,000
Total	$165,000
Working capital	10,000
Total	175,000

Operation Costs

It is difficult to estimate the costs of production of a mine that has no development. In order to operate profitably the applicants believe that the grade of their ore should be 0.5 to 0.6 percent WO_3. An

analysis of the general run of costs for small mining and milling operations justifies such an assumption. The estimate of the cost of production is partly estimated and partly calculated. The calculated costs are based on the following data:

Mill heads, 0.5 percent WO_3 or 10 lbs. per ton.

Flotation recovery, 85 percent. (This is lower than the applicants calculate but is more in accord with actual practice).

Chemical recovery, 93 percent.

Over-all recovery, 79 percent.

Pounds of WO_3 recovered per ton 7.9 lbs.

Cost per unit WO_3 for chemical treatment, $15.00.

Cost per pound WO_3 for chemical treatment, 0.75.

Cost per ton of ore for chemical treatment, $5.93.

Value per pound of WO_3, $3.15.

Value per ton of ore (7.9 x $3.15), $24.89.

Loan repayment, 5% royalty, per ton ore, $1.24.

Sales tax per ton of ore, $0.25.

Cost of mine plant and development, mill, chemical plant and other facilities, $165,000.

An estimate of the total costs of production follows:

Approximate Costs of Production of Scheelite from 50 tons of ore mined and milled per day with chemical treatment of concentrates

	per ton
Estimated Costs	
Mining from fairly large deposits	$ 7.50
Transportation of ore to mill	1.00
Milling by flotation including water	5.00
Overhead and miscellaneous	2.50
	$16.00
Calculated Costs	
Chemical treatment of concentrates	5.93
Royalty-loan repayment	1.24
Sales tax	0.65
Total before amortization & income taxes	$23.82
Amortization, $140,000/100,000 tons ore	1.40
Total before income taxes	$25.22
Value of 0.5 percent WO_3 ore per ton	$24.39
Value of 0.6 percent WO_3 ore per ton	$29.3[illegible]

Estimated Profit or Loss

On the basis of the foregoing analysis of costs, it is rather evident that in order to operate profitably a 50-ton flotation mill it is essential that the ore should contain approximately 0.6 percent WO_3. The capital required for a complete 50-ton per day plant would be approximately $175,000 of which $10,000 would be working capital. The chances are that the salvage value of a 50-ton mine and mill plant would not be more than $25,000. Therefore the amount to be amortized would be $140,000 which would require 100,000 tons of ore if amortization was at the rate of $1.40 per ton.

PROPOSED FINANCE

The applicants anticipate that including 5 percent for contingencies, the total cost of the project will be $32,000. They propose that either one or the other of the 2 partners will spend 4 days per week, excluding Saturdays and Sundays, supervising the operation of the project. For such services they request only that they be allowed $[illegible].00 per day for room and board for 4 days per week for 26 weeks, or a total of $832, and 200 miles of travel allowance per week at [illegible] cents per mile for 26 weeks, or $312, making a total of $1,144. On this basis the owners will provide the required engineering services including sampling and mapping. With a total cost of $32,000, the owners share on the basis of one-quarter participation by them will be $8,000 and the Government's share will be $24,000. Crediting the owners with travel and living expenses of $1,144 leaves their share $6,856 which "amount will be available as cash under any arrangement desirable by the Government".

CONCLUSIONS

The results of sampling done by the [illegible] examiners does not warrant any kind of an underground exploration program. The applicants have taken a total of [illegible] samples, 3 of which were assayed with the following results:

	Percent Mn3
1. Discovery shaft perimeter	0.21
2. 3 feet along trench	0.03
3. [illegible] feet along trench	0.43

They also took 3 samples which weighed from 5 to 10 pounds. These were stage crushed through a 35-mesh screen and run over a laboratory-

size Wilfley table. The concentrates were assayed and weighed and the grade of the crude ore was calculated. The concentrates assayed from 30 to 45 percent WO_3 and 3 to 8 percent MoO_3. On the basis of these 6 samples the applicants state "Large areas of mineralization will afford mill heads of 0.4 to 0.8 percent WO_3".

The matter of immediate interest to the DMEA examiners was to determine the grade of these "large areas of mineralization". Therefore, they took 8 representative samples of areas which the ultra-violet lamps indicated was strongly fluorescent and which the applicant had already sampled and found to be of commercial grade. The examiners samples ran approximately one-tenth of the value obtained by the applicants.

In order to substantiate the accuracy of their assaying the examiners sent the pulp of 3 samples to the Salt Lake City Laboratory of the Bureau of Mines for check assaying. The check assaying was remarkably close and since the examiners have confidence in their method of sampling they have come to the conclusion the sampling or assaying or both, which was done for the applicants, was misleading and incorrect, and that instead of having ore averaging 0.5 to 0.8 percent WO_3 the average is nearer 0.05 to 0.06 percent WO_3.

No evidence was seen to warrant the belief that exploration of any kind would develop ore of a higher grade. Therefore, further exploration work cannot be recommended.

The startling amount of fluorescence is either a very thin paint-like occurrence of powellite and scheelite, or perhaps a part of the

fluorescence is caused by calcite or some other unidentified mineral with very minor amounts of WO_3.

RECOMMENDATIONS

The examiners recommend that the application of Henderson and Kinnon for an exploration project on their Flying Saucer prospect be denied because sampling and assaying indicate that no ore anywhere near a profitable grade can be developed for the operation of a small flotation mill, and also because there is very little chance that a large low-grade deposit of tungsten ore subject to mining by open-pit methods on a large scale can be developed for profitable operation at the present market price of tungsten.