

UNITED STATES ATOMIC ENERGY COMMISSION
RAW MATERIAL DIVISION
COLORADO RAW MATERIAL OFFICE

EXAMINATION MADE FOR MR. MARC JENKINS
OF A PROPERTY IN THE WHITE SIGNAL MINING DISTRICT,
GRANT COUNTY, NEW MEXICO

By
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REPORT ON EXAMINATION MADE FOR MR. MARC JENKINS
OF A PROPERTY IN THE WHITE SIGNAL MINING DISTRICT OF
• GRANT COUNTY, NEW MEXICO

This is a report made of the examination of a prospect in the White Signal mining district of Grant County, New Mexico (see Fig. 1). The prospect herein called the J & K mine is located in an area mapped and described in detail by Stanton B. Keith (see Items 2, 3, and 4 of the appended bibliography). The prospect was mapped and sampled in detail, and tied into Mr. Keith's map (see Fig. 2). The uranium minerals present are the fluorescent torbernite and autunite, which occur along shear zones in a diabase dyke.

The ore is very low-grade and entirely confined to the oxidized zone; there is nothing to indicate any high-grade primary ore bodies. The low-grade nature of the ores prohibits any shipment of them as such.

The value of these ores depends upon finding a metallurgical process that will economically extract 250 tons of U_3O_8 contained in about 250,000 tons of rock and allow a cost of between \$5.00 and \$10.00 per ton for the ore.

The metallurgy of these ores was investigated by R. W. Handley¹ who expressed interest in an iron chloride leach process.

¹ R. W. Handley, Merry Widow Mine, White Signal District, (Grant County New Mexico, Interim Report on Treatment Procedures Applicable to Ores Sampled by S. B. Keith, (June, 1945, Union Mines Development Corporation).

Recommendations

It is recommended that the Atomic Energy Commission do no more prospecting or examination work in this region. If the Commission is interested, however, in deposits of this grade and size, the economics of the iron chloride leach process should be investigated further. If an economical process of metallurgy is found, it is the opinion of the writer that the local prospectors and miners will find and mine the ore with very little assistance.

Based on the price paid for ore on the Colorado Plateau, the writer's opinion is that the deposits are entirely uneconomical at this time unless the U_3O_8 can be extracted at a much lower cost than is possible with the Roscoelite-Carnotite type ores.

With the facts at hand, it is impossible to make any estimate of the reserves of the J & K mine as an individual prospect.

Introduction

Purpose - This examination was made at the request of Mr. Philip Leahy, who had received a letter from Mr. Marc Jenkins of Austin, Texas, about a prospect called herein the J & K mine. The purpose was to determine the economic possibilities of Mr. Jenkins' holdings.

Location - The J & K mine is located in the White Signal mining district of Grant County, New Mexico, about 20 miles via highway 180, south of Silver City (see Fig. 3).

Scope - The J & K mine is in an area which was mapped in detail by Stanton B. Keith and described in a paper called "Report on Detailed Examination of S-37 Occurrences in the White Signal and Associated Districts, New Mexico; Union Mines Development Corporation, July, 1945", to which is attached a review by George C. Selfridge.

Two full days, September 9 and 10, were spent in the field. The J & K mine with its related geology was tied in to Mr. Keith's map by a transit and stadia survey. Four samples were taken at the J & K mine for analysis. The Merry Widow mine was visited because Mr. Marc Jenkins, who has an option on this mine, had received reports that Mr. Keith's sampling of that mine had been inadequate. One sample was taken at this mine for the purpose of comparison. The Apache Trail mine was visited because the writer was not certain as to whether or not it had been examined by Mr. Keith. Mr. Jenkins was considering taking an option on this mine.

Acknowledgments - Mr. Marc Jenkins of Austin, Texas, called to our attention the J & K mine, which is a new discovery of U_3O_8 , in the White Signal district. Mr. Bill Kelly of Austin, Texas, and Mr. Jack Stockbridge of Silver City, New Mexico, accompanied the writer and helped with the field work. Mr. Ernest Weshman guided us to the Apache Trail mine. Mr. J. B. Mathis, a local engineer and co-locator of the J & K mine, loaned the writer a transit which greatly facilitated the field work.

Geology and Mineralogy

The best short discussion of the geology and mineralization of the region is given by S. B. Keith ¹. He states, "The country rock of the district examined is predominately a Pre-Cambrian granitic complex which is cut by irregular diabase, felsite and quartz monzonite dikes. A few coarse simple pognatites and barren quartz lenses occur along the strong sheeting in the granite. The granite and diabase dikes are badly shattered locally by fault veins but there are few major faults in the district.

"The mineralization is weak and consists for the most part of lenses of sulphides which have been thoroughly oxidized to a considerable depth. The S-37 are all secondary phosphates and are concentrated at or close to the intersections of the vein faults and the diabase dikes.

"The granite apparently contains very small amounts of radioactive minerals, both of SOM and thorium, which are believed to be the source of the secondary S-37."

1 S. B. Keith, Notes on the Use of the Geiger-Muller Counter In The White Signal District, Grant County, New Mexico, (August, 1945, Union Mines Development Corporation), Geo. C. Selfridge Review attached.

The uranium minerals identified in the field by the writer are Torbernite $\text{Cu}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 12 \text{H}_2\text{O}$, and Autunite $\text{Ca}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 12 \text{H}_2\text{O}$. Those who have made detailed studies of the region agree that the mineralization is the product of the reaction between high phosphate ground waters originating in the diabase dykes and uranium originating in the granites which are highly radioactive. The fact that the mineralization is always in the proximity of cracks and breaks in the diabase dykes, which would allow the passage of ground waters, makes this theory a plausible one. Any possibility that the Torbernite and Autunite are products of the decomposition of a high-grade primary uranium deposit is eliminated when one considers that in the Merry Widow mine the mineralization becomes weaker with depth as one approaches the bottom of the oxidized zone².

2 S. B. Keith, op. cit.

Description of Prospects

The J & K mine is located on the Little May claim, which is one of a group of six claims (Fig. 1) located and owned by J. B. Mathis and Joe Long.

The J & K mine represents a heretofore unknown occurrence of U₃O₈ in that the shaft was sunk after Mr. Keith had completed his field work in the region. In mineralogy and geology, however, it is similar to all the other occurrences described by Mr. Keith (see Fig. 2).

The mineralization occurs along faults and shears in a diabase dyke. This shear zone or fault contains lenses of sulphides and was called a gold lode by the locators. The other prospects, which are presumably in the same vein, were not located by the writer. However, they were shown on the claim map made by J. B. Mathis and were traced on to Figure 1 of this report. They are small pits and their exact location was not known by those accompanying the writer. It is believed that the so-called vein would carry U₃O₈ only where it crosses the diabase dyke.

The geology and sample data for this prospect are shown on Figure 4.

The Merry Widow mine is described in detail by S. B. Keith¹.

1 S. B. Keith, op. cit., pp 16, 17, Maps No's. 4 and 5.

The Apache Trail mine was visited by the writer because it was called the Copper Queen mine, and he did not recognize it as property that had been visited by Mr. Keith².

2 S. B. Keith, op. cit., p. 24, Map No. 20.

Economic Considerations

Metallurgy - The low-grade nature of the deposits would prohibit the transportation of them for any great distance as ore. Thus, they would have to be milled or concentrated in the immediate vicinity of the mines. R. W. Handley did some work on this problem. Briefly, his findings are as follows: Flotation is too costly and yields a concentrate which is too low grade. Leaching

by Fe Cl₃ yields interesting results. A 200-gram sample of ore running .16% U₃O₈ was leached with 400 cc of 5% Fe Cl₃·6H₂O solution to yield an indicated extraction of 81.2% of the U₃O₈ present in the sample¹.

¹ R. W. Handley, op. cit., pp. 8 and 9.

Ore Reserves - As a result of much detailed work, Mr. Keith estimates that there are 980 tons of rock, averaging .34% U₃O₈, and 14,245 tons of rock, averaging .08%². The U.S.G.S., after a brief reconnaissance, estimates 250,000 tons, averaging .10% U₃O₈³. As there has been one new discovery since Mr. Keith studied the region, it is the opinion of the writer that from the regional point of view Mr. Keith's figures are very conservative. If the local prospectors and miners were paid a commensurate price for the ore, the production of the White Signal district should easily reach the 250,000 tons estimated by the U.S.G.S.

² S. B. Keith, op. cit.

³ Ibid., P. 6, Selfridge review.

Future Prospecting

It is the belief of the writer that if the value of U₃O₈ reaches the point where mining in this region would be economical, the local prospectors and miners would prospect the region with a thoroughness that would be possible by no other method.

Most of the prospectors are already equipped with ultra-violet "mineralites". Use of this tool at night would enable them to pick up many deposits. The writer used one in the vicinity of the J & K mine.

Mining Costs

Mining costs in the region are as follows: \$35.00 per foot for sinking, \$17.00 per foot for drifting, and about \$3.00 per ton for stopping thin, spotty veins. Mr. Keith estimated about \$5.00 per ton overall mining costs.

Other Considerations

A remote possibility is the extraction of gold in addition to U_3O_8 from these ores, thus raising the value of the ore.

September 17, 1948

Louis P. Gaggini
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APPENDIX I

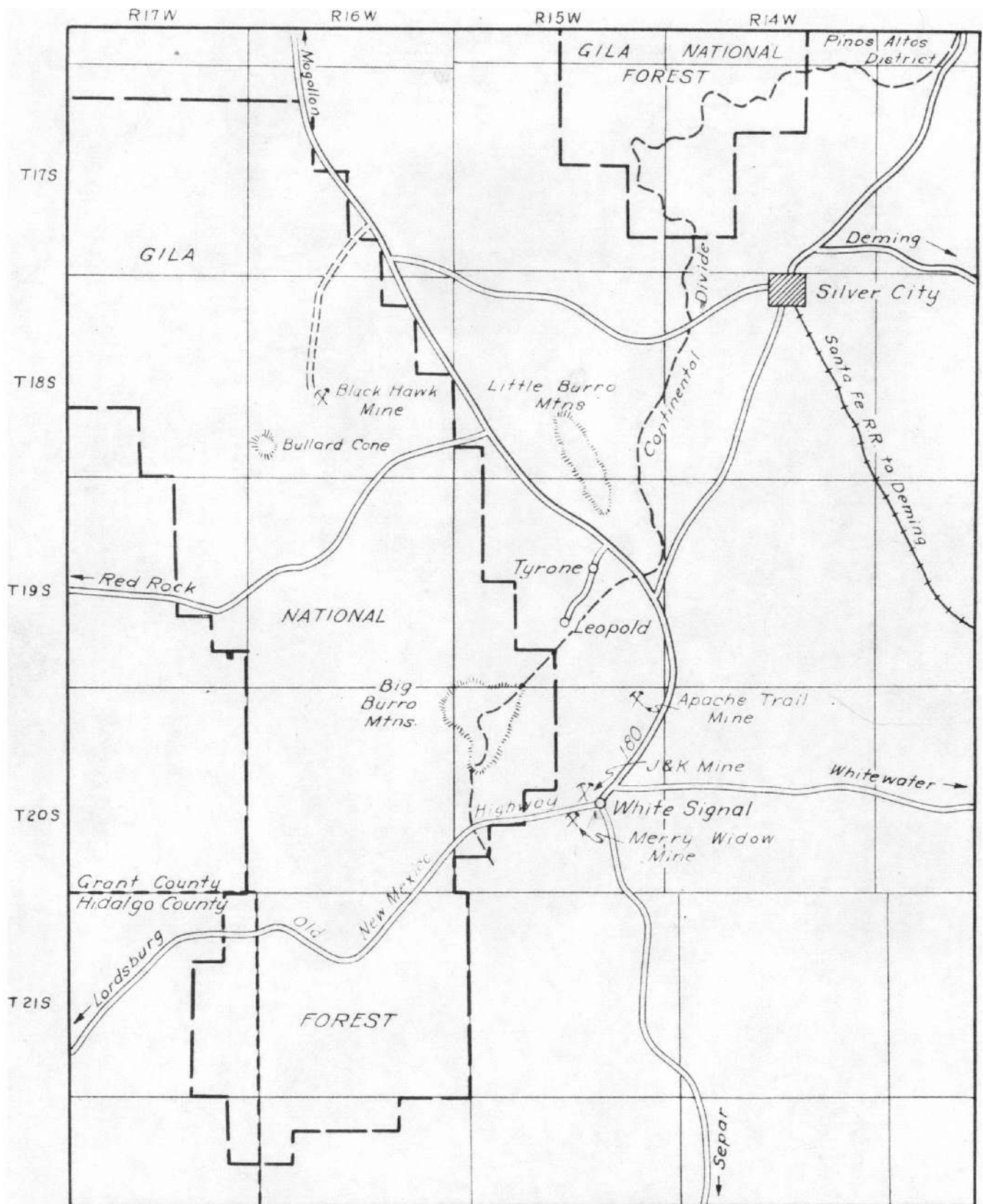
Tabulation of Sample Data

<u>No.</u>	<u>% U₃O₈</u>	<u>Length Inches</u>	<u>Mine</u>	<u>Remarks</u>
1	0.06	80	J&K	Altered Diabase
2	0.08	11	J&K	Altered Diabase
3	0.01	Grab	J&K	Gouge along fault
4	0.02	Grab	J&K	Altered Diabase exposed in open pit.
5	1.03	Grab	Merry Widow	Taken on 40' level 20' N.E. of shaft. Represents thin skin of clay-like gouge on hanging wall. Registers (in place) 1.0 on the 20 scale of the Beckman Beta Gamma Survey Meter. For detailed sampling at this mine see Item 3 of the bibliography.

APPENDIX II

Bibliography

- R. W. Handley, Merry Widow Mine, White Signal District, (Grant County) New Mexico. Interim Report on Treatment Procedures Applicable to Ores; Samples by S. B. Keith, (June, 1945, Union Mines Development Corporation)
- S. B. Keith, Reconnaissance of the White Signal, Black Hawk, and San Lorenzo Districts, and the Swanson-Lauef Property, New Mexico, (April, 1944, Union Mines Development Corporation)
- S. B. Keith, Report on Detailed Examination of S-37 Occurrences in the White Signal and Associated Districts, New Mexico, (July, 1945, Union Mines Development Corporation)
- S. B. Keith, Notes on the use of the Geiger-Muller Counter in the White Signal District, Grant County, New Mexico, (August, 1945, Union Mines Development Corporation)



Location Map of Southwestern Grant Co, N Mex.

Traced by R.M.G. 9-15-48

Fig. 1



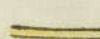

FIG. 2

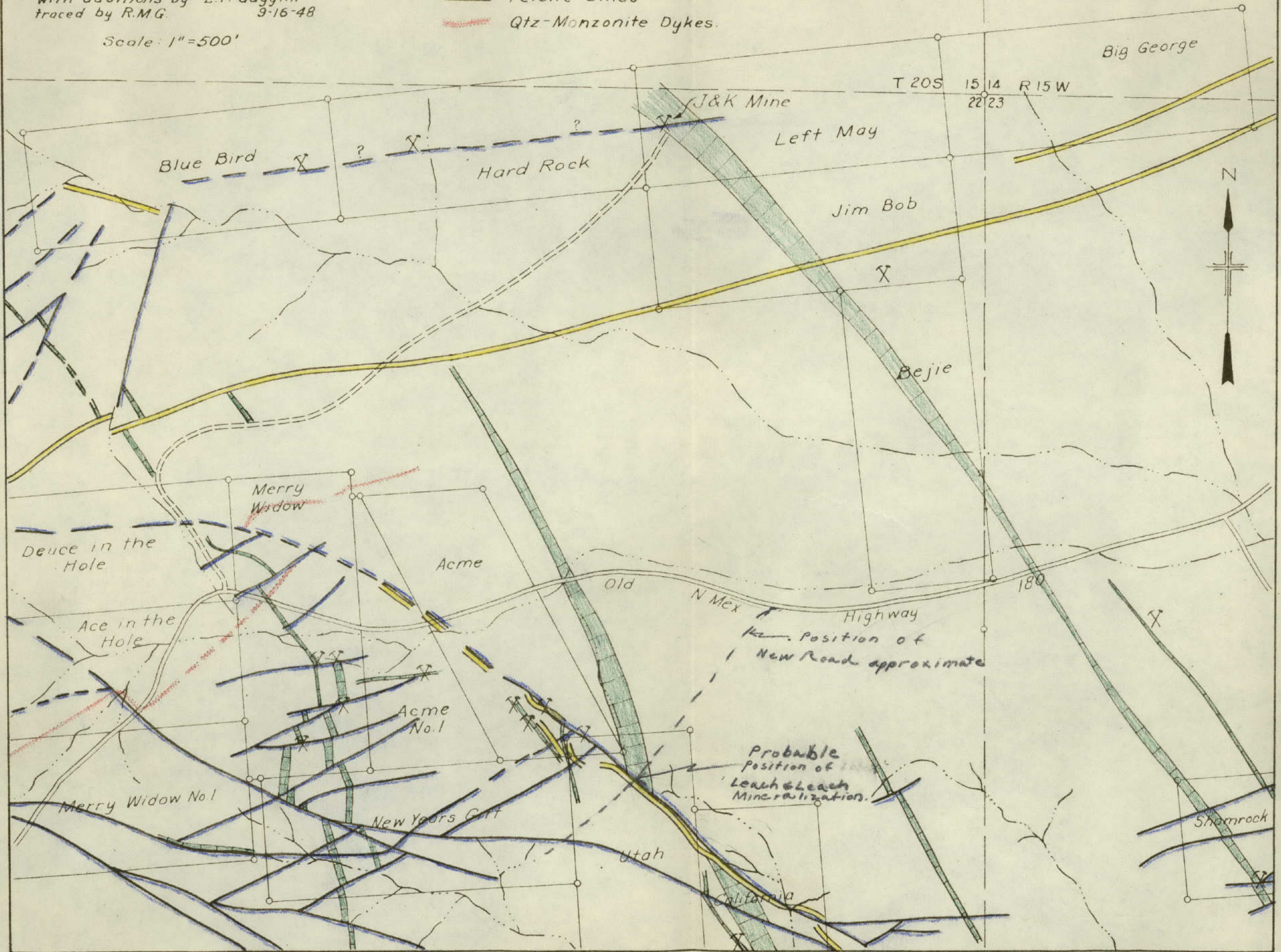
GEOLOGICAL MAP OF THE
WHITE SIGNAL DISTRICT

by Stanton B. Keith
with additions by L.P. Gaggini
traced by R.M.G. 9-16-48

Scale: 1"=500'

GEOLOGY

-  Faults and Veins.
-  Diabase Dikes
-  Felsite Dikes
-  Qtz-Monzonite Dykes.



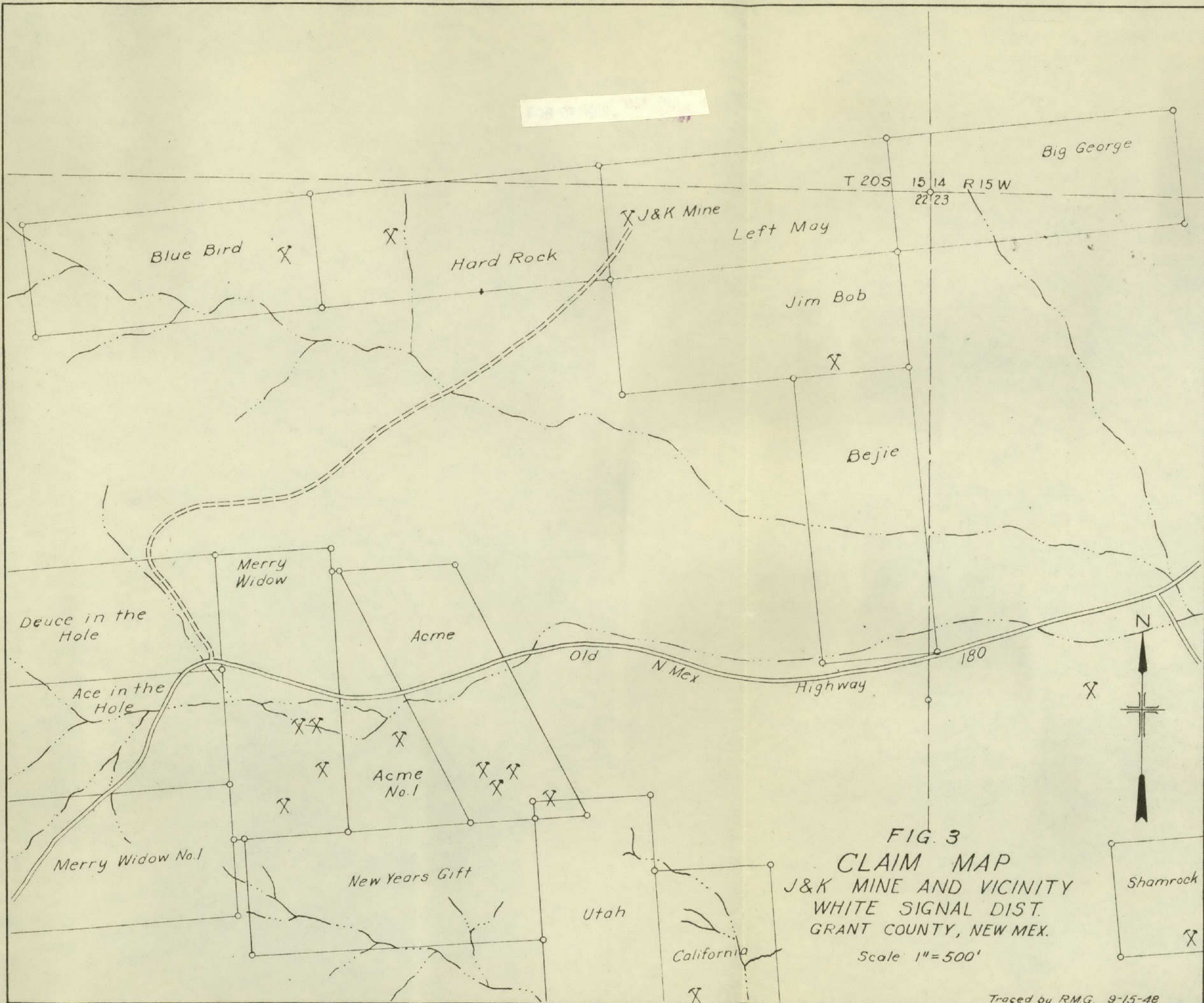


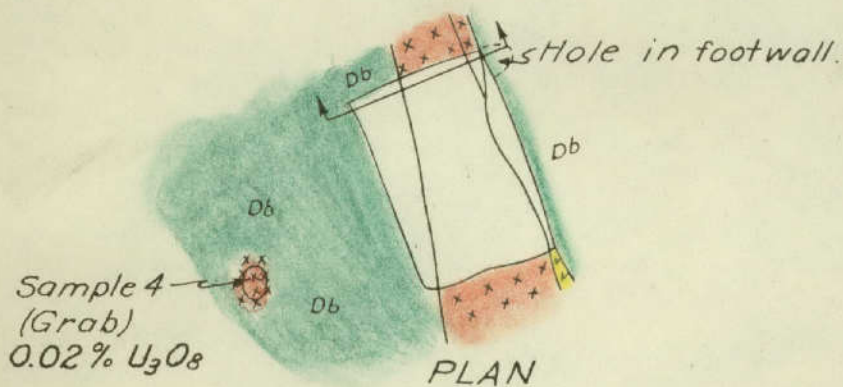
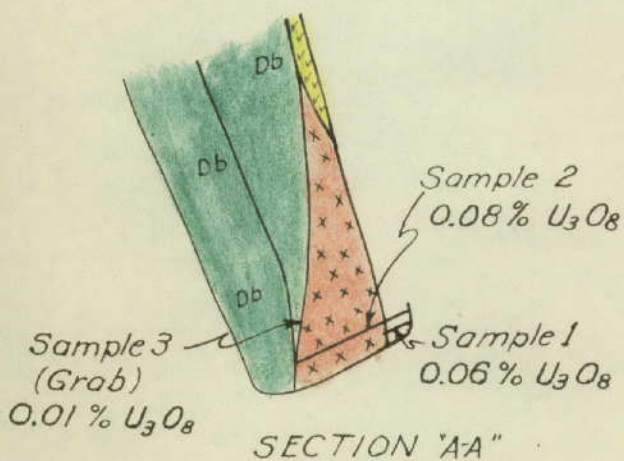
FIG. 3
CLAIM MAP
 J&K MINE AND VICINITY
 WHITE SIGNAL DIST.
 GRANT COUNTY, NEW MEX.
 Scale 1"=500'

Traced by RMG. 9-15-48

FIG 4
 THE J & K MINE
 WHITE SIGNAL MINING DISTRICT
 GRANT COUNTY, NEW MEXICO
 Scale: 1" = 10'
 Geology by L.P.G.

EXPLANATION

- Fault or shear gouge contains crystals of torbenite & autunite.
- Db Slightly altered diabase.
- ☐ Sulphide Vein.
- ☒ Highly altered diabase contains torbenite & autunite crystals.



Note:

Workings consist of one 7'x11' shaft 18' deep and one shallow open pit as shown. There is a hole in the footwall at the bottom of the shaft.