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PRELIMINARY REPORT ON THE GEOLOGY
OF THE TIGER (HIDEOUT) CLAIM, WHITE
CANYON AREA, SAN JUAN COUNTY, UTAH,
WITH RECOMMENDATIONS FOR EXPLORATION
FOR GEOLOGIC INFORMATION

By T. L. Finnell, B. L. Renzetti, and A. F. Trites, Jr.

Trace Elements Memorandum Report 479

UNITED STATES DEPARTMENT OF THE INTERIOR
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Geology - Mineralogy

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

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T. L. Finnell, B. L. Renzetti, and A. F. Trites, Jr.

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Trace Elements Memorandum Report 479

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*This report concerns work done on behalf of the Division
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ABSTRACT

The Tiger (Hideout) claim, a uranium-copper deposit in the Shinarump conglomerate, is in the S. 1/2 sec. 14, T. 36 S., R. 17 E., White Canyon area, San Juan County, Utah.

An area 450 feet long and 330 feet wide, including the underground workings of the Tiger claim and vicinity, has been mapped geologically at a scale of 1 inch equals 20 feet and a contour interval of 10 feet.

Most of the uranium and copper minerals are in sandstones of the Shinarump conglomerate that fill a scour channel 4 feet deep and 132 feet wide in the Moenkopi formation. Some copper minerals and abnormal radioactivity are present in the overlying Shinarump conglomerate and Chinle sandstones.

Minerals identified from the deposit include bayleyite, schroeckingerite (?), uranophane (?), uraninite or pitchblende, chalcopyrite, pyrite, limonite, bornite, chalcocite, jarosite, cuprite, hydrocarbons (?), calcite, malachite and azurite, covellite, montmorillonitic clay, and quartz.

Ore-bearing parts of the Shinarump appear to be slightly brecciated and are cut by numerous fractures. It is believed that the fracturing and brecciation may have localized the deposits of uranium minerals and thus may be a significant guide to ore.

The Tiger claim and vicinity are recommended for exploration by diamond drilling and geophysical methods to obtain geologic information on uranium-copper deposits in the Shinarump conglomerate and their relationship to scour channels in the Moenkopi formation.

INTRODUCTION

During June, July and August of 1952, a detailed geologic map on the Tiger claim was prepared by the U. S. Geological Survey. An area 450 feet long and 330 feet wide was mapped by plane table and alidade on a scale of 1 inch equals 20 feet and a contour interval of 10 feet. All the mapped area is covered by the Tiger claim. The underground workings were mapped by plane table, alidade, and tape measurements on a scale of 1 inch equals 20 feet, and sketches of one wall were prepared. The purpose of the mapping was to study the habits of the uranium minerals with relation to the geologic features of the White Canyon area. The work has been done by the U. S. Geological Survey on behalf of the Atomic Energy Commission.

The Tiger claim is recommended for exploration by diamond drilling to obtain geologic information on the trend, length, depth, and width of the scour channel, and the relationship of uranium and copper minerals to the Shinarump-filled channel and to fractures.

The authors wish to acknowledge the assistance of E. P. Beroni in mapping the underground workings and the cooperation of representatives of the White Canyon Mining Company.

Name, location, and ownership

The Tiger claim, formerly known as the Hideout claim, is in the S. 1/2 sec. 14, T. 36 S., R. 17 E., White Canyon area, San Juan County, Utah (fig. 1).

The Tiger claim is owned by the White Canyon Mining Company of Cortez, Colo. Development work on the Tiger claim consists of more than 320 feet of bulldozer trenching along the Shinarump outcrop and 70 feet of underground workings in two adits (fig. 2).

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Accessibility

A steep mine road 1 mile long connects the Tiger claim to a road on Deer Flat. The Deer Flat road is an ungraded dirt road that winds northeast to the head of Hideout Canyon, turns southeast between the Woodenshoe Buttes, crosses part of the Elk Ridge upland, and connects with Utah Highway 95, a graded dirt road, about 32 miles west of Blanding, Utah. When these dirt roads are dry, they are passable by all types of vehicles.

GEOLOGY

The Tiger claim is on the southwest flank of the Elk Ridge anticline and is in the Shinarump conglomerate of Upper Triassic age. The Shinarump crops out on a southeast-facing canyon wall. The formation is overlain by lower Chinle beds of Upper Triassic age and is underlain by the Moenkopi formation of Lower Triassic age, the Organ Rock tongue and the Cedar Mesa sandstone member of the Cutler formation of Permian age. The Moenkopi beds below the claim strike N. 75° W. and dip 4° SW.

Stratigraphy

The Cedar Mesa sandstone member of the Cutler formation is composed of thick beds of very pale-orange to grayish-orange fine-grained cross-bedded calcareous sandstone with local thin beds of red shale near the top. About 470 feet of the Cedar Mesa sandstone is exposed in the canyon below the Tiger claim.

Overlying the Cedar Mesa sandstone is 200 to 300 feet of pale reddish-brown micaceous siltstones and fine-grained sandstones that comprise the Organ Rock tongue of the Cutler formation.

The Organ Rock tongue is overlain by 200 to 350 feet of dark-brown to grayish-red thin-bedded siltstones, brown to yellow shale, and grayish-red to light-gray sandstones that comprise the Moenkopi formation. Dusky-red siltstones are altered to grayish yellow or very light gray for as much as 1 foot below the Shinarump.

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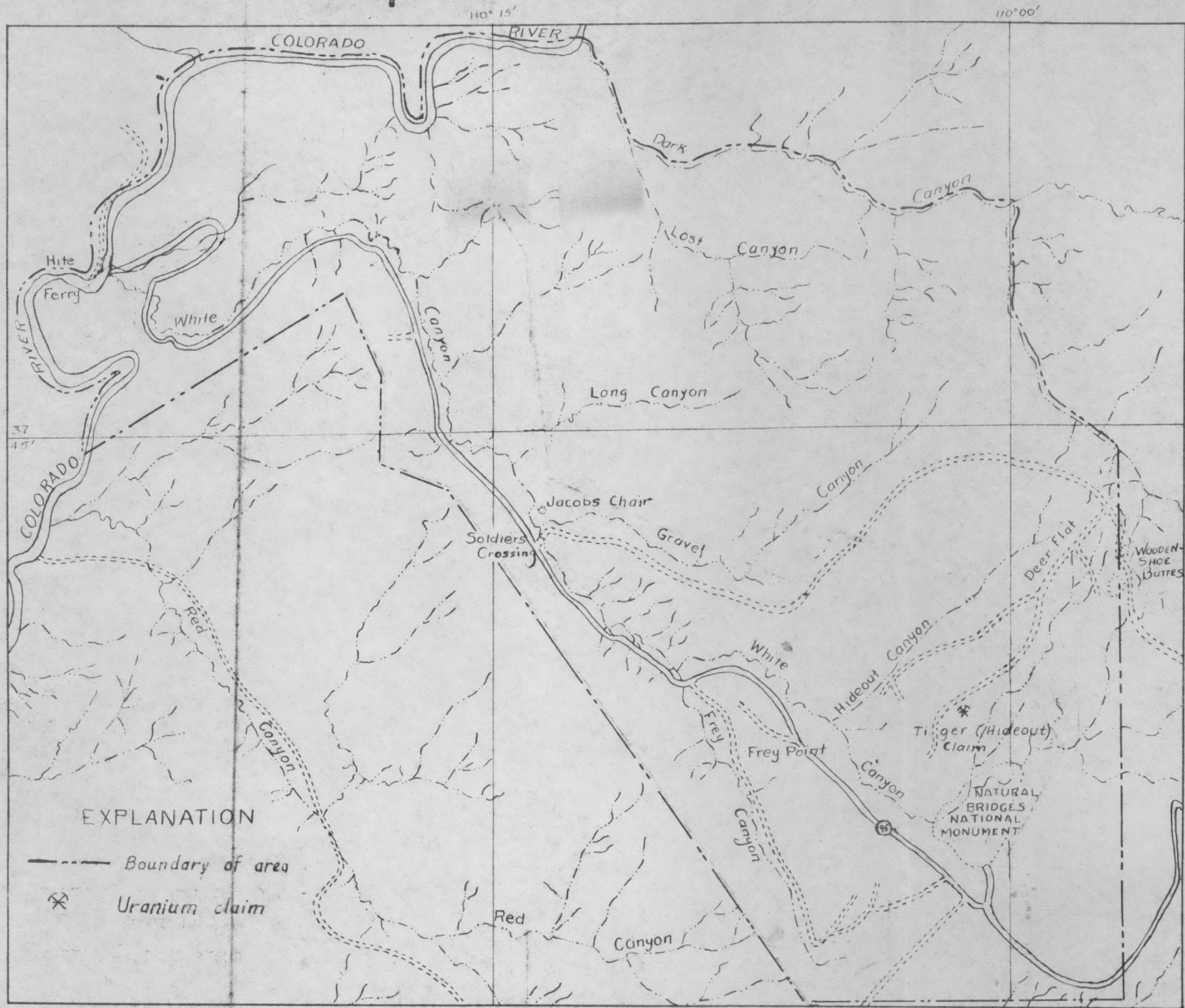


FIGURE I.- WHITE CANYON AREA, SAN JUAN COUNTY, UTAH

0 5 10 Miles

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The Shinarump conglomerate is 26 to 30 feet thick at the Tiger claim. The lower 12 to 16 feet is mineralized and consists of coarse-grained to conglomeratic sandstone with thin beds of siltstone and clay. The conglomerate pebbles are quartz, quartzite, siltstone, and altered volcanic ash. Some carbonized wood and silicified wood are present. The upper 14 feet of the Shinarump is composed of 3 to 4 feet of variegated siltstone and fine-grained sandstone that is overlain by medium- to very coarse-grained ferruginous sandstones. The upper sandstone intertongues with the variegated siltstone and fine-grained sandstone of the lower Chinle. At the Tiger claim the basal Shinarump sandstone fills a scour channel about 4 feet deep and 132 feet wide in the underlying Moenkopi formation (fig. 2). The channel is thought to trend N. 65° W. because a small scour channel 1 foot wide trends N. 65° W., a single festoon cross-bed trends N. 65° W., and most channels in the White Canyon area trend from N. 70° W. to S. 70° W.

The lower part of the Chinle formation, above the Shinarump, is 220 to 245 feet thick and consists of variegated clay and siltstone with interbedded conglomerate and fine- to coarse-grained sandstone. The stripped top of the upper sandstone in the lower Chinle forms Deer Flat.

Structure

Two very prominent sets of joints cut the rocks in the vicinity of the Tiger claim. The most prominent set strikes N. 45°-55° E. and dips from 65° SE. to vertical. The other set strikes N. 35°-45° W. and dips 85° SW. through vertical to 72° NE.

Normal faults with displacements as much as 6 inches cut the upper 14 feet of Shinarump. The faults of largest displacement strike north and dip 52°-65° W., and the faults of smaller displacement strike about N. 47° W. and dip 70°-75° NE.

URANIUM-COPPER DEPOSIT

Occurrence

The Tiger claim is a uranium-copper deposit in the Shinarump conglomerate. Most of the uranium and copper minerals are in the lower 6 to 8 feet of coarse-grained to conglomeratic cross-bedded sandstone where it fills a scour channel in the Moenkopi. Secondary copper minerals are present in the overlying Shinarump and lower Chinle sandstones as disseminated grains and as fracture coatings. Some limonite-coated fracture surfaces in Shinarump and Chinle sandstones in the vicinity of the mine workings are abnormally radioactive. No uranium minerals were seen on these fracture surfaces.

Mineralogy

The minerals in the Tiger claim are:

1. Bayleyite coating walls of calcite-cemented sandstones containing disseminated grains of chalcopyrite.
2. Schroeckingerite (?) associated with bayleyite.
3. Uranophane (?) disseminated in sandstone and coating fracture surfaces and bedding planes.
4. Uraninite or pitchblende intimately mixed with base metal sulphides.
5. Chalcopyrite disseminated in sandstone and replacing wood fragments.
6. Pyrite associated with chalcopyrite.
7. Limonite as fracture fillings, disseminated grains in sandstone, and gossan-like rims around chalcopyrite, pyrite, and bornite.
8. Bornite associated with chalcopyrite.
9. Chalcocite associated with chalcopyrite.
10. Jarosite disseminated in sandstone and coating fracture surfaces usually near carbonized wood.

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11. Cuprite intimately mixed with limonite (Cruner, J. W., personal communication, 1952).
12. Hydrocarbons (?) filling fractures and impregnating sandstone.
13. Calcite cementing sandstone and filling fractures.
14. Malachite and azurite disseminated in sandstone, and replacing wood, and coating fractures.
15. Covellite associated with chalcopyrite.
16. Montmorillonitic clay altered from volcanic ash (?).
17. Quartz replacing wood and forming silica overgrowths that give the detrital quartz grains an angular outline where crystal faces are developed.

Localization

The ore minerals are localized in coarse-grained to conglomeratic sandstone filling an erosional depression in the Moenkopi formation. The mineralized part of the Shinarump is cut by numerous fractures. Many of the fractures do not cut a 1-inch thick clay layer that overlies the sandstone, but either turn into bedding planes or end abruptly against the clay. Some quartz grains in the ore minerals are shattered and the ore-bearing parts of the Shinarump appear to be slightly brecciated.

Conclusions

Uranium and copper minerals at the Tiger claim are mostly confined to a broad filled scour channel at the base of the Shinarump conglomerate. The prominent occurrence of uranium minerals in brecciated sandstone in this channel suggests that they may have been localized in the more intensely fractured parts of the channel. Thus fracturing and brecciation of the Shinarump may be a significant guide to ore. The following recommendations for exploration are designed to test these relationships and provide information that may prove useful to further prospecting in the Deer Flat and Elk Ridge areas.

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RECOMMENDATIONS FOR EXPLORATION

Diamond drilling

The Tiger claim is recommended for exploration by the Survey by diamond drilling for the following geologic information:

1. Trend, length, depth, and width of the scour channel in the Moenkopi formation.
2. Relationship of uranium and copper minerals to the channel.
3. Relationship of fractures to channel trend and to uranium and copper minerals.
4. Relationship of Shinarump lithology to the channel.
5. Extent of uranium and copper minerals in the overlying lower Chinle beds.

The primary target will be the scour channel which crops out for about 140 feet along the bulldozer cut at the base of the Shinarump (fig. 2), and the relationship of the uranium and copper minerals to the channel. At the Tiger claim, a small channel scour 1 foot wide trending N. 65° W. and a single festoon cross-bed trending N. 65° W., together with the fact that most channels in the White Canyon district trend from N. 70° W. to S. 70° W., suggest that the scour channel trends N. 65° W. The drill-hole sites are located accordingly. The trend of the channel is unknown, however, and the tentative plan for drilling is to arrange the first group of holes on 50-foot centers along a line normal to the inferred channel trend and 60 feet behind the workings, to determine the trend, depth, and width of the scour. If the first group delineates the target, a second group of holes is planned on 50-foot centers along a line normal to the channel trend and 160 feet behind the workings. If the holes that delineate the channel do not yield adequate information on the relationship of the uranium minerals to the channel, six holes will be drilled along the channel trend to obtain more information. Three additional holes will be drilled on 20-foot centers along a line 25 feet behind the workings to obtain information on the relation of the uranium minerals to the channel and as a possible aid to the miners. If the first group of holes does not delineate the channel, the drill-hole sites may have to be moved so that they encompass the mine workings.

A minimum of 23 holes is required with depths that range from 40 to 120 feet; the total footage will be about 1,900 feet. If closer spacing is necessary to delineate the channel and the mineralized ground, additional holes will increase the footage requirements 1,100 feet. The footage requirements may thus range from a minimum of 1,900 feet to a maximum of 3,000 feet; all footage drilled should be cored.

All the proposed drilling sites can be made accessible with bulldozer work. Some of the large boulders may need to be reduced by drilling and blasting. A thin cover of soil and slope wash is present but in few places is it more than 1 to 2 feet thick. All the holes should be vertical and should bottom in red Moenkopi siltstone at least 1 foot below the base of the alteration zone.

If an extension of mineralized ground is found during the first drilling outlined above, a second phase should be undertaken to investigate the relationship of fractures to the mineralized ground and to the channel. This second phase of exploration would probably require about six holes inclined at 60° from the horizontal.

Geophysical exploration

Geophysical methods of exploration may prove to be a valuable aid to the discovery of new ore deposits and the delineation of uranium-copper deposits on Deer Flat. If the known uranium-copper deposits in the area yield interpretable anomalies, the entire Flat could be explored in a relatively short time. Dampness in the Tiger workings may reflect a concentration of water in the channel. This water and the relatively abundant copper minerals may yield areas of high conductivity with respect to the surrounding rocks. The growth of secondary sulphates and carbonates in the mine workings in the short time since mining operations ceased suggests that the water is charged with salts and would act as an electrolyte.

On Deer Flat, maximum depth to the Shinarump-Moenkopi contact is about 250 to 300 feet. In general, the overburden of Deer Flat consists of sandy soil up to 10 feet thick. Below the southeast rim of the area, above the Tiger claim, some talus and landslide blocks are present. Locally, this slide material may be 30 to 50 feet thick.

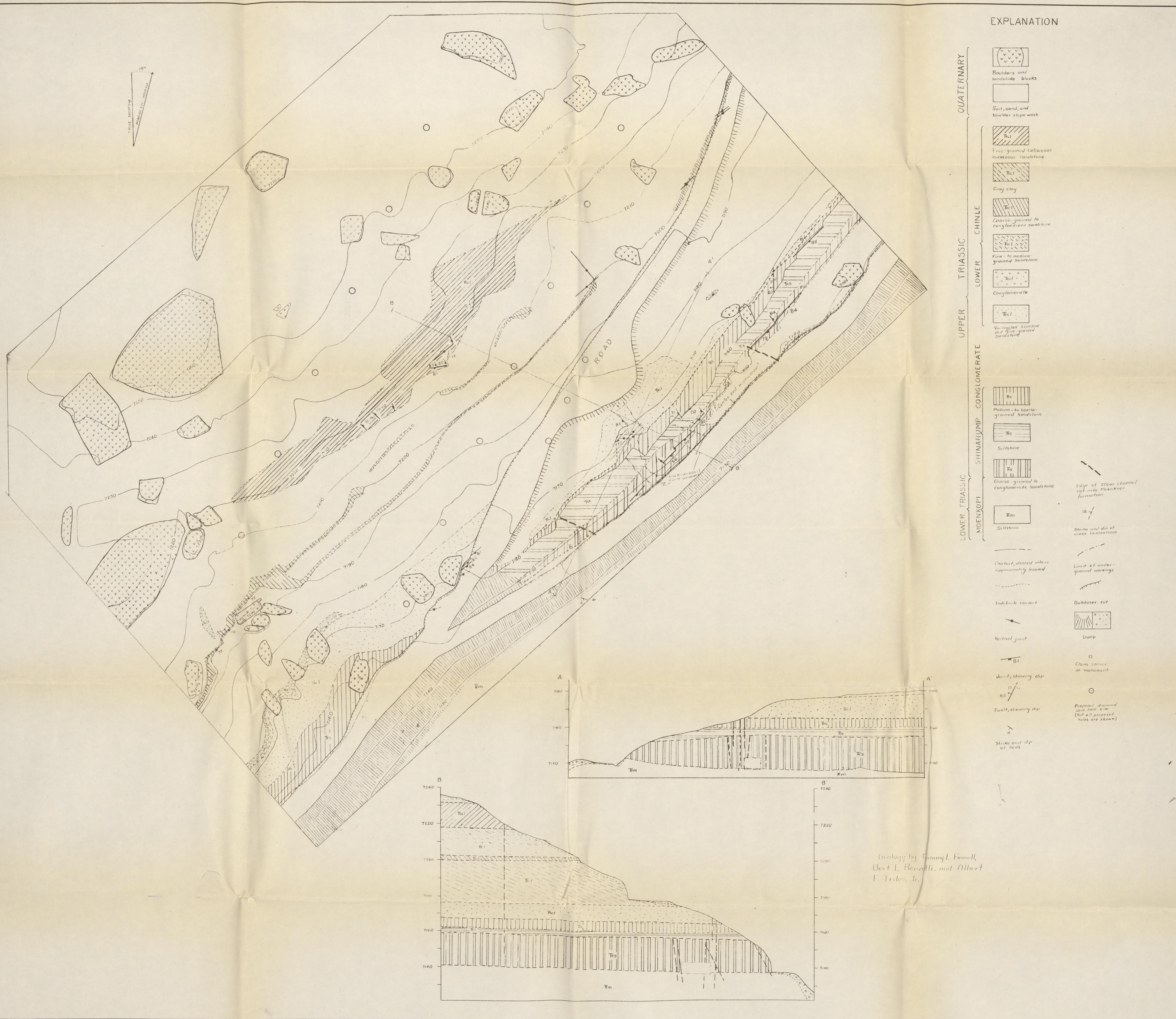


Figure 2.--GEOLOGIC MAP AND SECTIONS OF THE TIGER (HIDEOUT) CLAIM, SAN JUAN COUNTY, UTAH

