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The Uranium Deposit at the Yellow Canary Claims, Daggett County, Utah

Trace Elements Investigations Report 124

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Geology - Mineralogy

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Series A

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

THE URANIUM DEPOSIT AT THE YELLOW CANARY CLAIMS, DAGGETT COUNTY, UTAH*

By

V. R. Wilmarth, R. C. Vickers, F. A. McKeown, and E. P. Beroni

September 1952

Trace Elements Investigations Report 124

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THE URANIUM DEPOSIT AT THE YELLOW CANARY CLAIMS, DAGGETT COUNTY, UTAH

By V. R. Wilmarth, R. C. Vickers, F. A. McKeown, and E. P. Beroni

ABSTRACT

The Yellow Canary claims uranium deposit is on the west side of Red Creek Canyon in the northern part of the Uinta Mountains, Daggett County, Utah. The claims have been developed by two adits, three open cuts, and several hundred feet of bulldozer trenches. No uranium ore has been produced from this deposit.

The uranium deposit at the Yellow Canary claims is in the Red Creek quartzite of pre-Cambrian age. The formation is composed of intercalated beds of quartzite, hornblendite, garnet schist, staurolite schist, and quartz-mica schist and is intruded by diorite dikes. A thick unit of highly fractured white quartzite at the top of the formation contains tyuyamunite as coatings on fracture surfaces. The tyuyamunite is associated with carnotite, volborthite, iron oxides, azurite, malachite, brochantite, and hyalite. The secondary uranium and vanadium minerals are believed to be alteration products of primary minerals.

The uranium content of 15 samples from this property ranged from 0.000 to 0.57 percent.

INTRODUCTION

Although the presence of carnotite has been known in the Red Creek Canyon area since 1920 (Butler, 1920), there was little prospecting for uranium until C. E. Green and William Allen located the Yellow Canary No. 1 and No. 2 claims, on July 10, 1948. In 1950, part interest in the uranium deposit was sold to F. W. Bailey and J. R. McDermott, and subsequently the Canary Mining Company was incorporated with F. W. Bailey of Rock Springs, Wyo., President. The owners report that the mineral rights to approximately 1 square mile surrounding the original discovery have been claimed.

Location and accessibility

The uranium deposit at the Yellow Canary No. 1 and No. 2 claims, in Secs. 4 and 5, T. 2 N., R. 24 E., Salt Lake meridian, is in the northern part of Daggett County, in northeastern Utah (fig. 1). The deposit is on the west side of Red Creek Canyon in the northern part of the Uinta Mountains (fig. 2). The Yellow Canary claims are 70 miles by road south of Rock Springs, Wyo., and 62 miles by road northwest of Sunbeam, Colo. The roads to the claims are generally open throughout the year. Detailed road logs to the deposit are as follows:

Road log from Sunbeam, Colo. to Yellow Canary claims

	Mileage
Sunbeam, Colo.; go north on Colorado State Highway 318.	0
Road junction; follow road to left, Colorado State 318.	21.9
Road junction; follow road to right; road to left is Moffat County road No. 12 and leads to Greystone, Colo.	23.3
Road junction; follow Colorado State 318 to left; road to right is Moffat County road No. 10 to Greystone.	32.7
Road junction; follow Colorado State 318 to right.	36.7
Road junction; follow road to left; road to right is Colorado State 318 and leads to Rock Springs, Wyo.; road to left is Moffat County No. 10.	38.0
Road junction; follow road to right.	38.3
D. Worley ranch to the right.	38.5
Blevins Ranch to the right.	40.7
School house.	41.2
Road junction; follow road to right.	42.7
Road junction; follow road to right.	44.0
Road junction; follow road to right.	44.1
Road junction; follow road to left.	44.8

Road log from Sunbeam, Colo. to Yellow Canary claims--Continued

	Mileage
Road junction; follow road to left.	46.8
Road junction; follow road to right.	48.9
Road junction; follow road to right.	49.0
Allens Ranch to the right.	49.3
Road junction: follow road to right.	49.6
Road junction; follow road straight ahead.	50.0
State line - End of Moffat County No. 10.	50.6
Road junction; follow road straight ahead.	52.3
Road junction; follow road to left.	53.6
Radosevich ranch to right; follow road to left.	54.1
Road junction; follow road straight ahead.	54.4
Road junction; follow road straight ahead.	54.8
Road junction; follow road to left.	55.0
Road junction; J. G. Taylor ranch to left; follow road to right.	56.1
Road junction; follow road to left; road to right leads up Jessie Ewing Canyon and to Clay Basin; road follows river.	57.7
End of road at mine.	62.5

Road log from Rock Springs, Wyo. to Yellow Canary claims

	Mileage
Road junction of U. S. Highway 30 and Wyoming State Highway 430 at Rock Springs. Follow Highway 430 south from Rock Springs.	0
Road junction; leave Highway 430, follow road to right.	11.3
Road junction; follow road to right.	15.9
Road junction; follow road to left.	18.6
Road junction; follow road to right.	25.1
Road junction; follow road to left.	25.6
Road junction; follow road to right.	29.8

Road log from Rock Springs, Wyo. to Yellow Canary claims--Continued

	Mileage
Road junction; follow road to right.	32.8
Road junction; follow road to left.	35.5
Road junction; follow road to left.	37.4
Road junction; follow road to left.	40.4
Road junction; follow road to left.	52.2
State line.	53.7
Murphy #3 well; keep straight ahead.	54.8
Clay Basin operation office.	55.1
Road junction; follow road to right.	57.6
Road junction; straight ahead.	59.4
Road junction; follow road to right; road to left leads to Allens ranch.	64.3
At mine-end of road.	70.0

The uranium deposit at the Yellow Canary claims was brought to the attention of the U. S. Geological Survey by H. D. Bailey of Stibnite, Idaho, who submitted a sample from these claims that contained 1.38 percent uranium. In August 1950, F. A. McKeown and E. P. Beroni, of the U. S. Geological Survey, made a brief examination of the uranium deposit, and recommended further investigation of the deposit. During August 1951, V. R. Wilmarth and R. C. Vickers spent 5 days in field work in the area in order to obtain detailed information about the deposit and to evaluate the uranium reserves. The geology and topography of approximately one-tenth square mile surrounding the deposit was mapped on a scale of 1:1,200 or 100 feet to the inch. Radiometric examination of the surface outcrops and sampling of the deposit were completed.

Thanks are due to C. E. Green and William Allen for their hospitality and assistance.

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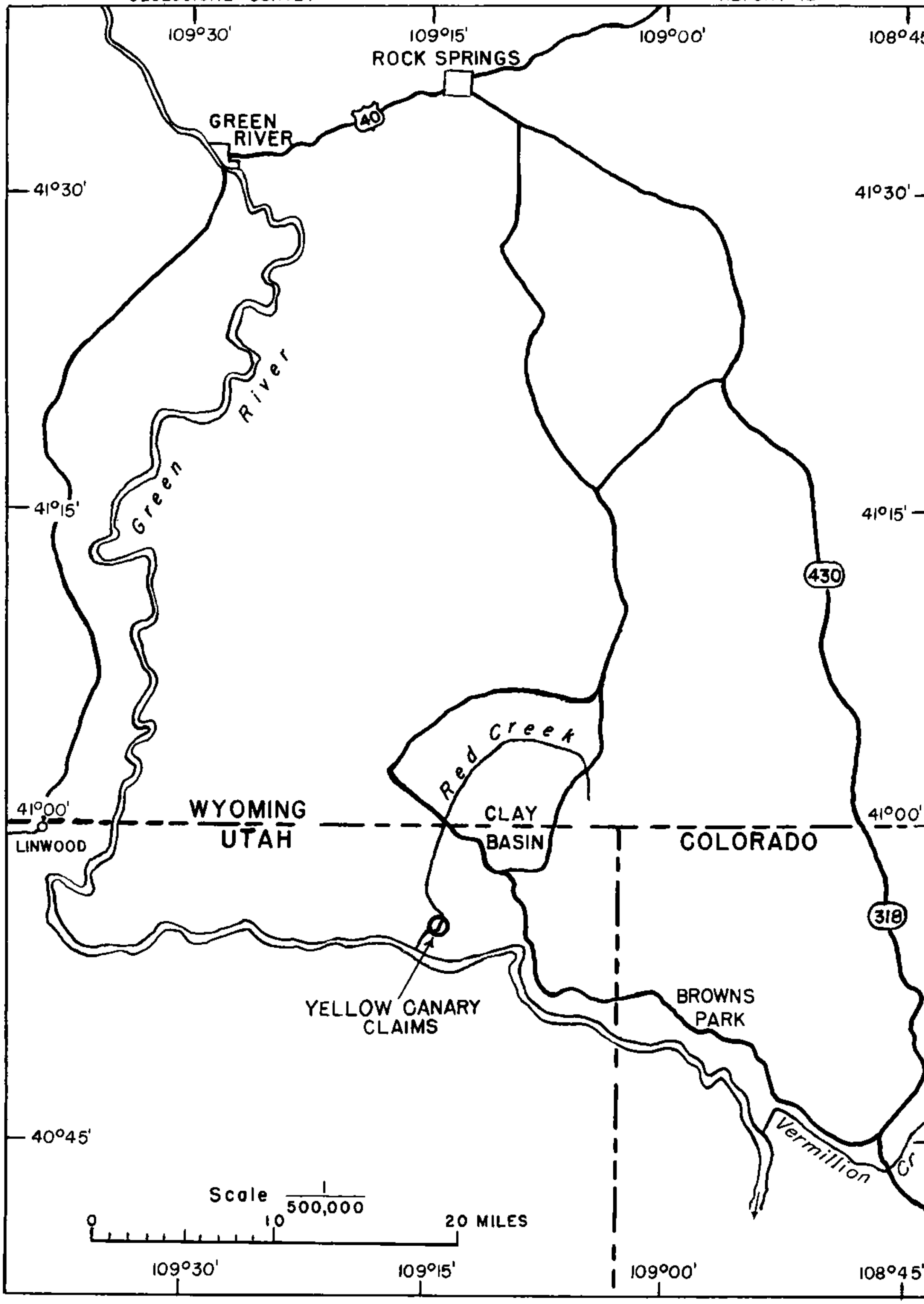

FIGURE 1.— INDEX MAP SHOWING YELLOW CANARY CLAIMS, DAGGETT COUNTY, UTAH

Mine workings

The deposit is explored by three open cuts, two adits, approximately 700 feet of bulldozer trenches, and several prospect pits (fig. 3). Exposed in Pit No. 1 is a northwest-trending fracture zone that contains the richest uranium-bearing quartzite. The 190-foot long exploration adit was driven to intersect this zone at approximately 100 feet below the surface, and the bulldozer trenches were dug primarily to explore the uranium-bearing quartzite west of Pit No. 1. A caved adit is reported by the owners to extend southwest from Pit No. 1 for nearly 40 feet along a narrow copper-bearing vein.

GEOLOGY

Rock units

The rocks exposed in the northern part of the Uinta Mountains (fig. 2) include a basement complex of Red Creek quartzite and the Uinta formation of pre-Cambrian age in fault contact with a thick series of Paleozoic sedimentary rocks. The Paleozoic section is overlain by Mesozoic, Tertiary, and Quaternary sedimentary rocks. Dark-green diorite dikes of probable pre-Cambrian age intrude the Red Creek quartzite in the Red Creek Canyon area. The uranium deposit described in this report is in the quartzite.

The rocks exposed in the area of the Yellow Canary No. 1 and No. 2 claims include the Red Creek quartzite of pre-Cambrian age, diorite dikes of probable pre-Cambrian age, and Recent alluvium deposits.

Red Creek quartzite

The Red Creek quartzite is exposed over much of the mapped area (fig. 3). It is described by Powell (1876, p. 137) as very crystalline and white with intercalated beds of hornblende, chloritic, and micaceous schist, all greatly implicated. Schultz (1920, p. 24) remapped the Red Creek quartzite and stated that the intercalated schists are intrusive. Sears (1924, pp. 269-319) included the Red Creek as part of the Uinta formation of Pre-Cambrian age. In the northern part of the Uinta Mountains, the Uinta formation unconformably overlies the Red Creek quartzite; this contact is approximately 1 mile east of the mapped area.

The Red Creek quartzite (fig. 3) includes a thick unit of white quartzite and a complex sequence of hornblendite, garnet schist, staurolite schist, quartz-mica schist, and dark gray quartzite. The thick unit of white quartzite unconformably overlies the complex sequence of other metamorphic rock. The typical white quartzite is a thin- to thick-bedded rock that has been folded and fractured extensively. It is almost wholly composed of quartz grains, but the granular structure of the rock is apparent in only a few places. Petrographic study shows the quartzite to be very pure with the individual grains of uniform size for the most part. All of the quartz grains show undulatory extinction and many are drawn out as if by dynamic metamorphism. Most of the grains are corroded and many are in part replaced by muscovite at the edges of the grains. Tyuyamunite, carnotite, volborthite, hematite, brochantite, malachite, hyalite, azurite, quartz, sericite, calcite, and manganese oxide are the accessory minerals. Many fractures in the quartzite have been cemented with hematite, calcite, and chalcedony, but others are open. Fluorescent hyalite coats fracture surfaces in the quartzite near Pits No. 1 and No. 2, but none was found in other parts of the mapped area.

Hornblendite, a fine- to medium-grained, dark-green to black rock, occurs in beds that range from 2 feet to 10 feet in thickness and can be traced along the strike for 80 feet. Numerous veins of chalcedony, not more than an inch thick, cut the hornblendite near its contact with the white quartzite. One- to two-inch wide veins of epidote cut across and parallel the foliation in the hornblendite. The hornblendite beds locally are bordered by a two- to four-inch wide zone composed of hornblende in a fine-grained groundmass of quartz, muscovite, and biotite. Staurolite and garnet schist commonly are in contact with the hornblendite. In thin section the rock has a granular texture and is composed of 92 percent hornblende, 5 percent chlorite, and 3 percent of fine-grained muscovite. The subhedral to anhedral hornblende crystals range from 0.04 mm to 0.8 mm in length, average 0.06 mm in width, and are rimmed with chlorite. Interstitial to the hornblende grains are minor quantities of muscovite.

Garnet schist layers as much as 2 feet wide, exposed for as much as 300 feet along the strike, are composed of almandine porphyroblasts in a fine-grained groundmass of quartz and muscovite. The porphyroblasts range from 1 mm to 18 mm in diameter and locally make up 30 percent of the rock. The garnet schist grades laterally into garnet-staurolite schist.

The light- to dark-gray staurolite schist contains staurolite porphyroblasts in a fine-grained groundmass of quartz, muscovite, and biotite. The staurolite porphyroblasts range from 1 mm to 60 mm in width, and constitute as much as 60 percent of the rock.

The light-gray, fine- to medium-grained quartz-mica schist is composed of quartz, muscovite, biotite, and minor hematite. Interbedded with the quartz-mica schists are layers of dark-gray, medium-grained quartzite composed of quartz with accessory muscovite and biotite.

Diorite dikes

The igneous rocks in the Red Creek Canyon area, as described by Butler (1920, pp. 600-601), are dark-green dioritic rocks that have been considerably altered. In the mapped area (fig. 3), the dikes are typically dark-green to black, fine-grained rocks that are heavily stained by hematite. Commonly the dikes cut across the quartzite bedding, but in a few places they are conformable. The dikes are later than the Red Creek quartzite and probably of pre-Cambrian age. The dike rock in thin section has a hypautomorphic-granular texture and is composed of hornblende 60 percent, plagioclase 15 percent, quartz 20 percent, and the accessory minerals hematite, chlorite, sericite, and clay make up 5 percent of the rock. Hornblende occurs in subhedral to anhedral grains that average 0.06 mm in width and 0.16 mm in length. The hornblende grains have been altered to chlorite along the edges and most of them have been elongated, probably by dynamic metamorphism. Quartz and fine-grained plagioclase, in part altered to sericite and clay, are interstitial to the hornblende. The dikes range from 2 feet to 15 feet in width and are exposed for as much as 200 feet along the strike.

Structure

The Red Creek Canyon area is in the Uinta Mountains, which were formed by dissection of a west-trending asymmetric anticline. Faults in the northern part have placed pre-Cambrian metamorphic rocks against Paleozoic and Mesozoic sedimentary rocks. Curtis (1950, p. 93) believes this faulting is in part responsible for the exposure of Red Creek quartzite in this area, and Schultz (1920, p. 24) has mapped a northeast-trending anticlinal and synclinal structure in the Red Creek Canyon area. In the mapped area this synclinal structure has been cut by northeast-trending normal faults (fig. 3, section A-A').

In the mapped area (fig. 3) the metamorphic rocks have been severely deformed. They have a pronounced foliation that trends northeast and dips steeply to the northwest, but at two places the foliation trend deviates widely: one place is west of the road where the foliation strikes N. 20° W., dipping 74° SW., and the second place is in the stream valley west of Red Creek, where the foliation strikes N. 76° W., dipping 48° S. No satisfactory explanation for these discrepancies can be made at this time; however, these local variations suggest that the rocks have been complexly folded.

The folded and faulted white quartzite bed overlies the metamorphic rocks with a marked angular unconformity. In the vicinity of the uranium deposit the white quartzite has been folded into a minor anticline and syncline (fig. 3). West of Pit No. 1, bedding in the quartzite has an average strike of approximately N. 45° E. and dips 20° to 64° NW., whereas east of Red Creek the quartzite bed has an average strike of N. 50° E. and dips 25° to 76° S. Minor folds in the quartzite are numerous and reflect the complexity of the major folding.

In the vicinity of the uranium deposit (fig. 3) the major structures are three normal, northeast-trending longitudinal faults. Fault No. 1 is a low angle fault that is exposed only near the end of the 190-foot exploration adit. It strikes N. 60° E., dips 13° S., and is marked in the adit by a fault breccia zone as much as 10 feet thick which contains abundant sericite, clay, and small fragments of white quartzite interstitial to boulders of white quartzite as large as 4 feet across. The owners report (oral communication) that two boulders of white quartzite with coatings of yellow and green uranium and vanadium minerals were found in the fault breccia in the adit. Fault No. 1 has placed a mass of folded white quartzite over the undifferentiated metamorphic rocks (fig. 3). This fault has a vertical displacement of about 100 feet and a horizontal displacement of nearly 600 feet. In the northeast part of the mapped area, Fault No. 2 strikes N. 40° to 45° E., dips 68° S. and has a vertical displacement of approximately 75 feet. Although this fault is not exposed west of Red Creek it is believed to be older than Fault No. 1. Fault No. 3 trends northeast, dips 76° N. and intersects Fault No. 1 near the portal of the exploration adit. The vertical displacement of Fault No. 3 was not determined accurately but the displacement must be greater than 100 feet or Fault No. 1 would be exposed in the metamorphic rocks east of Red Creek (cf. fig. 3, section A-A').

Joints are numerous in the quartzite in this area. The most prominent joints strike N. 62° to 85° W. and many of them strike about N. 80° W. The joint planes are vertical or dip steeply northeast or southwest. Another set of joints that is much less well developed and not nearly so extensive has an average strike of N. 65° E. and dips steeply to the northwest. In Pit No. 1 the prominent joints are the loci for the deposition of the uranium and vanadium minerals, whereas most of the lesser joints are not mineralized.

Ore deposits

The copper deposits in Red Creek and Jessie Ewing Canyons were not studied in detail but they have been described briefly by Butler (1920, pp. 604-605). They consist of fissure veins of quartz or quartz and carbonates that contain metallic sulfides. The veins strike northeast and dip steeply to the northwest and southeast. The deposits are associated with diorite dikes and amphibolite. Chalcopyrite and chalcocite are the most abundant sulfides; hematite, bornite, malachite, quartz, and azurite are the accessory minerals. The uranium minerals tyuyamunite and carnotite were found at an abandoned copper deposit in Red Creek Canyon. They occur as fracture fillings in the quartzite and are associated with volborthite, hematite, malachite, azurite, brochantite, hyalite, and quartz.

Uranium deposits

Butler (1920, p. 605) described the carnotite-bearing copper deposits in the Red Creek Canyon area. At the Yellow Canary claims, massive carnotite and massive to finely-crystalline yellow tyuyamunite are disseminated sparsely in the highly fractured and contorted white quartzite member of the Red Creek quartzite of pre-Cambrian age. The size and shape of the uranium deposits could not be determined because of the sparse outcrops of the uranium-bearing quartzite. During the present investigation carnotite-and tyuyamunite-bearing quartzite were found only in Pit No. 1; however, McKeown and Beroni report uranium minerals in a small pit, now covered, approximately 100 feet southeast of Pit No. 1. In Pit No. 1 the uranium minerals are concentrated for the most part in a 3 to 8-foot wide zone of highly fractured white quartzite. This zone trends northwest, dips steeply south and can be traced for as much as 100 feet along the strike. If this zone is assumed to be continuous with the uranium-bearing quartzite in the pits examined by McKeown and Beroni, the horizontal length of the zone is as much as 125 feet. Uranium minerals were not found in the quartzite in the bulldozer trenches west of Pit No. 1 but several small isolated boulders that contain yellow uranium minerals on fracture surfaces were found in the trench just east of Pit No. 1 and in the breccia zone in the adit. In the 190-foot adit, no abnormal radioactivity was found but faulting may have disrupted the continuity of the mineralized zone in the quartzite.

Mineralogy

Tyuyamunite, a hydrated calcium uranium vanadate, is the principal ore mineral recognized at the deposit. It was identified by X-ray powder pattern by M. E. Thompson of the U. S. Geological Survey. Spectrographic analysis of the tyuyamunite showed uranium, vanadium, and silica to be major constituents; as minor constituents, calcium, aluminum, and iron; and as trace constituents, magnesium and copper. Tyuyamunite occurs, for the most part, as thin coatings, less than 3 mm thick, on fracture surfaces and as crystalline aggregates that partially fill small vugs, as much as 5 cm across, in the quartzite. The tyuyamunite grains are commonly thin bright lemon-yellow to pale yellow, non-fluorescent, tabular to subhedral flakes with the flat side parallel to the surface on which they occur. Small but well developed tabular crystals coat the more open fracture surfaces in the quartzite. The largest and best developed crystals of tyuyamunite were found in the hematite-filled vugs. Locally, botryoidal masses of tyuyamunite less than 1 mm across occur on the massive tyuyamunite fracture coatings. Gradations from the bright yellow characteristic of the tyuyamunite crystals to the pale yellow tyuyamunite grains on the fracture surfaces may be found.

A lemon-yellow, massive uranium mineral identified as carnotite by X-ray powder pattern is associated with tyuyamunite and volborthite. It occurs for the most part interstitial to the flakes of tyuyamunite in specimens from Pit No. 1.

Volborthite, a hydrous vanadate of copper and barium, is much less abundant than tyuyamunite. Its mode of occurrence is similar to that of tyuyamunite, but it is most commonly found in specimens from Pit No. 2. It occurs as dark olive-green masses of finely crystalline radial aggregates and as coatings less than 2 mm thick on fractures in the quartzite. The volborthite locally coats the tabular crystals of tyuyamunite in vugs.

Malachite, a green carbonate of copper, is abundant as fracture coatings and as vug fillings in the quartzite specimens from Pit No. 2. Clear brilliant green crystals of malachite, as much as 20 mm in length and 3 mm in width, are associated with volborthite, tyuyamunite, azurite, and brochantite. Locally the vanadium and uranium minerals are intermixed with the malachite. In general, the malachite is later than the volborthite and tyuyamunite.

Small masses of azurite, intimately mixed with brochantite, coat surfaces in the quartzite. The dark-blue azurite grades into the pale-green malachite. These secondary copper minerals were deposited later than tyuyamunite.

Calcite is a common gangue mineral. It occurs as thin coatings on fractures in the quartzite and generally is later than the copper, uranium, and vanadium minerals. Calcite crystals as much as 6 mm across locally fill vugs in the quartzite.

Clear, glassy, quartz crystals as much as 5 mm in length line the vugs and open fractures in the quartzite. The quartz crystals are rarely perpendicular to the walls on which they were deposited, but more commonly form an irregular surface on which the quartz crystals are alined with their long dimensions parallel to the walls of the fractures. Quartz is the earliest mineral deposited.

Dark red-brown massive hematite forms thin coatings on the fractures and locally fills small vugs in the quartzite.

Hyalite, which contains enough uranium to fluoresce a brilliant yellow-green, is abundant in the quartzite near Pit No. 1 and Pit No. 2. It occurs as white to yellowish-white botryoidal masses and as thin coatings on fractures. An ultra-violet light survey of the mapped area (fig. 3) showed that the fluorescent hyalite was found only in the immediate vicinity of the uranium-bearing quartzite. Future prospecting in the Red Creek Canyon area with an ultra-violet light may lead to the discovery of other uranium deposits.

Specimens of quartzite from Pit No. 1 contain a black powdery mineral as thin coatings on the fractures. Although no definite minerals have been identified, spectrographic analysis of this material showed the major elements to be aluminum, manganese, iron, and silica, the minor elements to be copper, cobalt, and vanadium, and traces of calcium, magnesium, lead, and nickel. This material is apparently a mixture of several secondary copper and vanadium minerals.

The owners report that a black sooty highly radioactive material--possibly sooty pitchblende--was found along fractures in the quartzite at the portal of the caved tunnel. The writers did not find any of this material during the examination of the property; however, the presence of sooty pitchblende may indicate primary uranium minerals at depth.

Radioactivity

Radiometric examination of the Yellow Canary No. 1 and No. 2 claims was made with a beta-gamma survey meter. The average background of the instrument, which was neither calibrated nor standardized, was 3 divisions on the 0.2 scale. Abnormal radioactivity, which caused a deflection that ranged from 15 on the 0.2 scale to 15 on the 2.0 scale, was detected in Pits No. 1 and No. 2. Radiometric survey of the surface outcrops in the immediate vicinity of the pits indicated no abnormal radioactivity; nor was radioactivity above normal background detected in the metamorphic rocks that underlie the white quartzite.

A reconnaissance radiometric survey of the copper deposits in Red Creek and Jessie Ewing Canyons indicated no abnormal radioactivity in the deposits.

Grade

The surface workings show that the uraniferous quartzite is exposed only in Pit No. 1. The richest sample collected by the writers contained 0.57 percent uranium; it was hand picked from Pit No. 1 as the highest-grade material there. The uranium content of the other samples (table 1) ranged from 0.000 to 0.56 percent.

Suggestions for prospecting

It is obvious from the data obtained from surface and underground workings that the extent of uranium mineralization in the white quartzite on the hanging wall of Fault No. 1 is not great. Because boulders of white quartzite in the fault breccia zone contain secondary uranium and vanadium minerals, the movement along Fault No. 1 probably occurred after deposition of the uranium minerals, and the vertical extent of the uranium-bearing fracture zone in Pit No. 1 probably has been cut off by this fault. Therefore, prospecting for uranium in the vicinity of the Yellow Canary claims might be most profitably carried on by shallow bulldozer trenches or shafts in the white quartzite some 600 feet northwest of Pit No. 1. The prospects of uncovering vein material that contains primary uranium minerals in this area are encouraging.

Origin

The origin of the uranium deposit at the Yellow Canary claims can only be inferred from a study of the small exposure of uranium-bearing quartzite in Pit No. 1. The concentration of the uranium, vanadium, and copper minerals along fractures in the white quartzite strongly indicates that the deposition of the ore was controlled by structures and rock types.

Inasmuch as the uranium and vanadium minerals do not occur in the copper-bearing hornblendite and are associated only with copper deposits in the white quartzite, it can be concluded that there were at least two periods of mineralization: first, the copper mineralization of the hornblendite, and second, the introduction of copper-, uranium-, vanadium- and silica-bearing solutions along fractures in the quartzite. It is believed that the secondary minerals, tyuyamunite and volborthite, exposed in Pit No. 1 are indicative of primary uranium and vanadium minerals at depth. This supposition is in part substantiated by the discovery (by the owners) of a black sooty highly radioactive material along fractures at the portal of the caved tunnel.

Table 1.--Spectrographic analyses of samples from Yellow Canary No. 1 and No. 2 claims, Daggett County, Utah 1/

Field Number	Material	U 2/	Si	Al	Ti	Mn	Fe	Ca	Mg	Na	Ba	Be	Co	Cr	Cu	Ca	Mo	Ni	Pb	Sr	V	Y	Zr	B	Ag	Bi	Sn	Sc
51-W-86	Grab sample of hornblendite, 1/2 mile south of mine	---	XX.	XX.	.X	.X	XX.	X.	X.	.X	.00X	Tr.	.00X	.0X	.0X	.00X	.00X	.00X	.00X	.00X	.0X	.00X	.00X	.00X	.00X	---	.00X	.00X
51-W-87	Grab sample of diorite dike northwest of Pit No. 1	---	XX.	XX.	.X	.X	XX.	.X	X.	.X	.00X	---	.00X	.0X	X.	.00X	.000X	.00X	.00X	.000X	.0X	.00X	.00X	.00X	.00X	---	.00X	.00X
51-W-88	Grab sample of hornblendite, 1 mile south of mine	---	XX.	XX.	.X	.X	XX.	X.	X.	.X	.00X	---	.00X	.0X	.0X	.00X	.000X	.00X	.00X	.00X	.0X	.00X	.00X	.00X	.00X	---	.00X	.00X
FK-7-13	Grab sample from dump, tyuyamunite-bearing quartzite	0.56	XX.	.X	.0X	.0X	X.	X.	.0X	---	.0X	Tr.	.0X	.00X	X.	---	.00X	.00X	.0X	.000X	.X	.00X	---	.000X	.000X	.00X	---	---
FK-7-14	do.	.10	XX.	.X	.0X	.0X	X.	.X	.0X	---	.0X	.000X	.00X	.00X	.X	---	.00X	.00X	.00X	.000X	.0X	.00X	---	.000X	.000X	.00X	---	---
FK-7-15	do.	.57	XX.	.X	.0X	.0X	X.	.X	.0X	---	.0X	Tr.	.0X	.00X	.X	---	.00X	.00X	.0X	.000X	.X	.00X	.00X	.000X	Tr.	.00X	---	---
FK-7-16	9-foot chipped front channel sample, tyuyamunite-bearing quartzite from Pit No. 1.	.11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----	----	----	---	----	----	----	----	----	---	----
51-W-76	5-foot channel sample, tyuyamunite-bearing quartzite from Pit No. 1	.029	XX.	.X	.0X	.0X	X.	.0X	.00X	---	.00X	.000X	.00X	.00X	.0X	---	.00X	.00X	.00X	----	.X	.00X	.00X	----	-----	---	---	----

1/Spectrographic analyses by P. J. Dunton, Trace Elements Section Denver Laboratory

2/Chemical analyses of uranium by Trace Elements Section Denver Laboratory

Table 1.--Spectrographic analyses of samples from Yellow Canary No. 1 and No. 2 claims, Daggett County, Utah--Continued

Field Number	Material	U 2/	Si	Al	Ti	Mn	Fe	Ca	Mg	Na	Ba	Be	Co	Cr	Cu	Ca	Mo	Ni	Pb	Sr	V	Y	Zr	B	Ag	Bi	Sn	Sc
51-W-77	4.5-foot channel sample, quartzite from Pit No. 1	0.006	XX.	.X	.OX	.OX	X.	.OX	.OOX	---	.OOX	---	Tr.	.OOX	.OOX	---	.OOX	.OOX	.OOX	----	.OOX	----	.OOX	-----	-----	----	---	---
51-W-78	6-foot channel sample of tyuyamunite-bearing quartzite from Pit No. 1	.050	XX.	.X	.OX	.OX	X.	.OX	.OOX	--	.OOX	.OOOX	.OOX	.OOX	.OX	----	.OOX	.OOX	.OOX	---	.OX	.OOX	.OOX	---	---	---	---	--
51-W-79	2.5-foot channel sample of diorite dike southeast of Pit No. 2	.001	XX.	X.	X.	.OX	XX.	X.	X.	X.	.OX	.OOOX	.OOX	.OOX	.OX	.OOX	.OOX	.OOX	.OOOX	.OX	.OX	.OOX	.OX	---	---	---	---	--
51-W-80	7-foot channel sample of quartzite from north side Pit No. 2	.001	XX.	.X	.OX	.OX	X.	.OX	.OX	--	.OOX	----	.OOOX	.OOX	.OOX	----	.OOX	.OOX	----	---	.OOX	---	.OOX	---	---	---	---	--
51-W-81	8-foot channel sample of quartzite from west side Pit No. 2	.001	XX.	.X	.OX	.OX	X.	.OX	.OX	--	.OOX	----	.OOOX	.OOX	.OX	----	.OOX	.OOX	----	---	.OOX	---	---	---	---	---	---	---
51-W-82	5-foot channel sample of quartzite from south side Pit No. 2	.000	XX.	.X	.OX	.OX	X.	.OX	.OX	--	.OOX	----	Tr.	.OOX	.OOX	----	.OOX	.OOX	----	---	.OOX	---	---	---	---	---	---	---
51-W-84	Grab sample of quartzite from end of lower road	.001	XX.	.X	.OX	.OX	X.	.OX	.OX	--	.OOX	----	Tr.	.OOX	.OOX	----	.OOX	.OOX	----	---	---	---	---	---	---	---	---	---
51-W-85	2.5-foot channel sample of diorite dike near Pit No. 2	.001	XX.	X.	X.	.X	XX.	X.	X.	X.	.OX	.OOOX	.OOX	.OOX	.OOX	.OOX	.OOX	.OOX	----	.OX	.OX	.OOX	.OX	---	---	---	---	---

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PART II

RESERVES

The reserves of uranium at the Yellow Canary No. 1 and No. 2 claims cannot be evaluated until the uranium-bearing quartzite in the vicinity of Pits No. 1 and No. 2 is sufficiently explored to determine its extent at the surface. The estimated and inferred reserves of uranium at this property are approximately 500 tons of rock that contains 0.04 percent uranium.

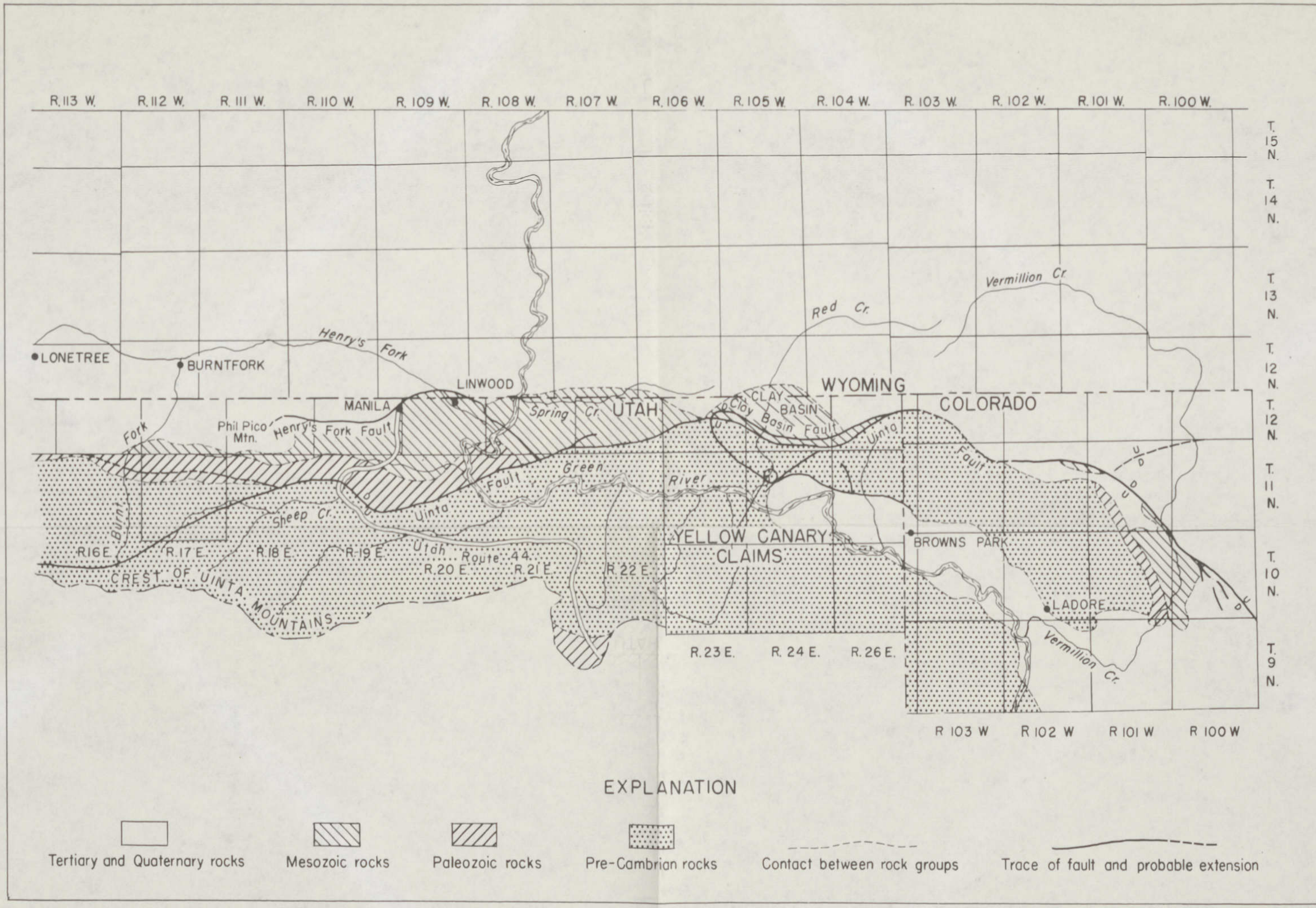

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FIGURE 2.– GEOLOGIC MAP, NORTH FLANK UINTA MOUNTAINS, COLORADO, UTAH, AND WYOMING

10 0 10 20 Miles

GPO 82-8000810

FIGURE 3.— GEOLOGIC MAP AND SECTION OF PART OF THE YELLOW CANARY NO. 1 AND NO. 2 CLAIMS, DAGGETT COUNTY, UTAH

Geology and topography by V.R. Wilmarth and R.C. Vickers, August 1951.

100 0 100 200 Feet

Contour interval 20 feet

Datum is approximate sea level