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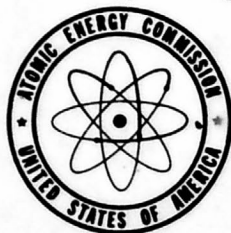
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UNITED STATES ATOMIC ENERGY COMMISSION

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PRELIMINARY REPORT ON SOME URANIUM
DEPOSITS ALONG THE WEST SIDE OF THE
SAN RAFAEL SWELL, EMERY COUNTY, UTAH

By
Millard L. Reyner

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Division of Raw Materials
Exploration Branch



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PRELIMINARY REPORT ON SOME URANIUM DEPOSITS
ALONG THE WEST SIDE OF THE SAN RAFAEL
SWELL, EMERY COUNTY, UTAH

By Millard L. Reyner

INTRODUCTION

Twelve uranium-bearing deposits were examined along 30 miles of the western border of the San Rafael Swell in Emery County, Utah, from September 21 to 29, 1950.

The area examined lies in Emery County, east-central Utah, along the west flank of the San Rafael anticline (Fig. 1). It extends from T. 20 S. to T. 24 S., and R. 8 E. to R. 11 E. (Plate I).

The region is easily accessible from Castle Dale (population 600) via a graded road down Buckhorn wash 26 miles to a bridge across the San Rafael River. From this bridge a dirt road skirts the eastern side of the district southward to the Muddy River. Most of the uranium prospects can be approached by driving up dry washes in an automobile. A road also leads into the district from the town of Green River on U. S. Highway 50. It is 45 miles from Green River to Temple Mountain, thence 10 miles westward to the dirt road mentioned above. The Denver & Rio Grande Western Railroad passes through Green River and, to north of the area, through Price (population 8,300) 31 miles north of Castle Dale.

All the mine owners contacted were very cooperative in showing their properties to the writer and in giving all information requested.

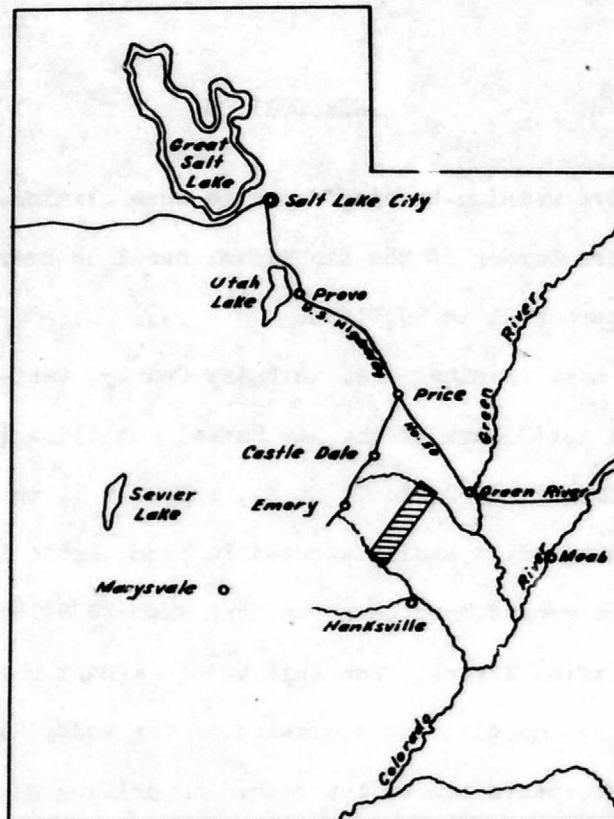


Figure 1. Index Map of Utah showing location of area examined.

GEOGRAPHY

Typical badland topography prevails throughout the area. The San Rafael River, Muddy River, and numerous intermittent streams have carved steep-walled canyons and wide washes, leaving buttes and mesas capped by resistant sandstone beds. Maximum relief is approximately 1500 feet. The region is drained southeastward into the Colorado River by the San Rafael River and Muddy River.

Rock exposures are excellent, and contacts can be traced without interruption for miles. The upper beds of the Moenkopi formation and the lower beds of the Shinarump conglomerate form steep slopes, usually greater than 45 degrees, which rise from the valley floors to the base of the cliff-forming sandstones and conglomerates of the Shinarump. The red Chinle formation, where not eroded away, forms steep slopes resting on the Shinarump. Above the Chinle the massive Wingate sandstones rises in vertical cliffs generally over 300 feet high, and where the Kayenta formation and the Navajo sandstone are present, sheer cliffs over 600 feet high are common. Above the Navajo, the topography is subdued by the slope-forming soft shales of the Carmel formation.

The area is semi-arid, with an annual precipitation of 5 to 10 inches. Temperatures range from 20° to 110° F. The winters are not severe and snow does not ordinarily disrupt mining operations. Vegetation consists of abundant small cedars and pinions, unsuitable for mine timbers, with some sagebrush and grass. A few cattle and

sheep are ranged across the broad inner dome of the San Rafael Swell.

There are no permanent inhabitants. Except for one or two small springs, drinking water is lacking. Livestock obtain water from small seeps and reservoirs.

HISTORY

There has been very little mineral production from the district. During 1949 about 180 tons of ore shipments were made.

Early in 1950 a uranium rush swept the district, and in March over 900 claims were recorded and several hundred more were staked. Enthusiasm was high and, in the rush, costly mistakes were made. After a few ore shipments were refused as too low-grade, the fever subsided. In late 1950 only one mine was being worked -- the Dirty Devil No. 4 on the Muddy River.

REGIONAL GEOLOGY

The area lies on the western flank of the San Rafael Swell, a large asymmetric anticline about 100 miles long and 50 miles wide, with its axis trending N. 30° E. and slightly convex toward the east. The sedimentary rocks dip gently westward (2 to 10 degrees) along the west flank, and steeply eastward (75 to 85 degrees) along the east flank. Baker¹ has mapped the eastern side of the Swell, and

1. Baker, Arthur A., Geology of the Green River-Cataract Canyon region, Emery, Wayne, and Garfield Counties, Utah: U.S. Geol. Surv. Bull. 951.

Gilluly ² the western side.

The Swell consists of a broad inner dome of Carboniferous (?), Permian, and Lower Triassic rocks ringed by cliffs of Upper Triassic and Jurassic (?) rocks. According to Gilluly ³, a number of igneous sills and dikes occur in the southwestern part of the Swell, all of them lying south of the Muddy River. He has dated them as post-Morrison and probably Tertiary.

ECONOMIC GEOLOGY

General

The locations of the uranium-bearing deposits examined are shown on Plate I. All of the deposits are near the base of the Shinarump conglomerate. The Shinarump conglomerate, upper Triassic in age, is a widespread formation recognized for thousands of square miles over the plateau province. It rests on the eroded surface of the lower Triassic Moenkopi, and its contact with the upper Triassic Chinle above is gradational. In the area examined, the formation ranges in thickness from 100 to 175 feet and consists principally of thick-bedded, cliff-forming sandstones and conglomerates, with thin interbedded shales and mudstones. It is extremely variable, with numerous intra-formational unconformities and abrupt lateral variations.

2. Gilluly, James, Geology and oil and gas prospects of part of the San Rafael Swell, Utah: U.S. Geol. Surv. Bull. 806, 1929.

3. Gilluly, James, op. cit., p. 120.

It contains abundant fossil trees, most of which are silicified; some, however, are carbonized and others are merely decayed wood. A large majority of these fossil trees are not uranium-bearing. Even where lying in a uranium-bearing lens, large tree trunks usually do not contain appreciable amounts of uranium. In contrast, the small branches and twigs usually contain uranium when lying in an ore-bearing zone.

In a broad sense, the position of the uranium-bearing zone is easily recognized as a black or lavender band at or near the base of the cliffs ringing the inner dome of the Swell. In detail, however, the exposures of this zone are poor because it is often buried beneath the steep talus slopes formed by debris from the cliffs above. In many places it is too high to be reached without a ladder.

The uranium-bearing deposits consist of small lenticular to tabular mineralized portions of sandstone, conglomerate, or shale beds. They usually lie upon gray and green shales which in turn rest upon the eroded surface of the Moenkopi formation. The radioactive lenses in sandstone and conglomerate are usually thicker than those in shale and sandstone. Radioactive exposures can rarely be traced more than a few hundred feet. The longest exposure is about 500 feet long and 1 foot thick in a shale bed on the Dirty Devil No. 2 claim. The thickest productive lens, 4.5 feet thick, is on the Dirty Devil No. 4 claim. It can be traced for only a few feet along the outcrop, but there is no appreciable change in width for 32 feet into the hill where opened by an adit.

Mineralogy

The following description of the mineralogy of the ores is based solely on megascopic observations.

Most of the uranium is intimately associated with blebs and seams of asphalt, and with small branches and twigs of carbonized wood. The blebs or "pellets" and seams of asphalt almost invariably lie parallel to the bedding. On outcrops they are often soft and sooty, but a few feet underground they are hard and break with a conchoidal fracture.

Some green, yellow, and orange uranium minerals are present on and adjacent to the asphalt. On the Lone Tree group a greenish-yellow, waxy, highly radioactive uranium mineral, which fluoresces bright green and resembles autunite, lies a few inches above a high-grade asphalt lens in a seam of siltstone from 0.05 to 0.10 foot thick. Some orange gummite (?) is associated with the asphalt seam. On the Green Vein group and Pay Day claim, considerable green meta-torbernite occurs in association with a 0.10-foot seam of coarse sandstone containing malachite, azurite, and chrysocolla. On the Hertz No. 1 claim, an apple-green, somewhat earthy, radioactive material is associated with a high-grade asphalt seam and an underlying shaly mudstone. On the Dirty Devil No. 2 claim, considerable greenish-yellow and apple-green, waxy, radioactive material lies in a shaly mudstone beneath a high-grade asphalt seam.

Carnotite was not recognized at any of the properties. A little pyrite occurs in a thin seam below the high-grade asphalt lens on the Lone Tree claim, and some cobalt "bloom" was noted here. Native

sulphur is present in several localities, a little silver is present throughout the uranium-bearing zone, and traces of gold are reported. The vanadium content is low, increasing from almost nil in the northern part of the area to a ratio of about 1:1 with uranium in the southern part.

Deposits examined

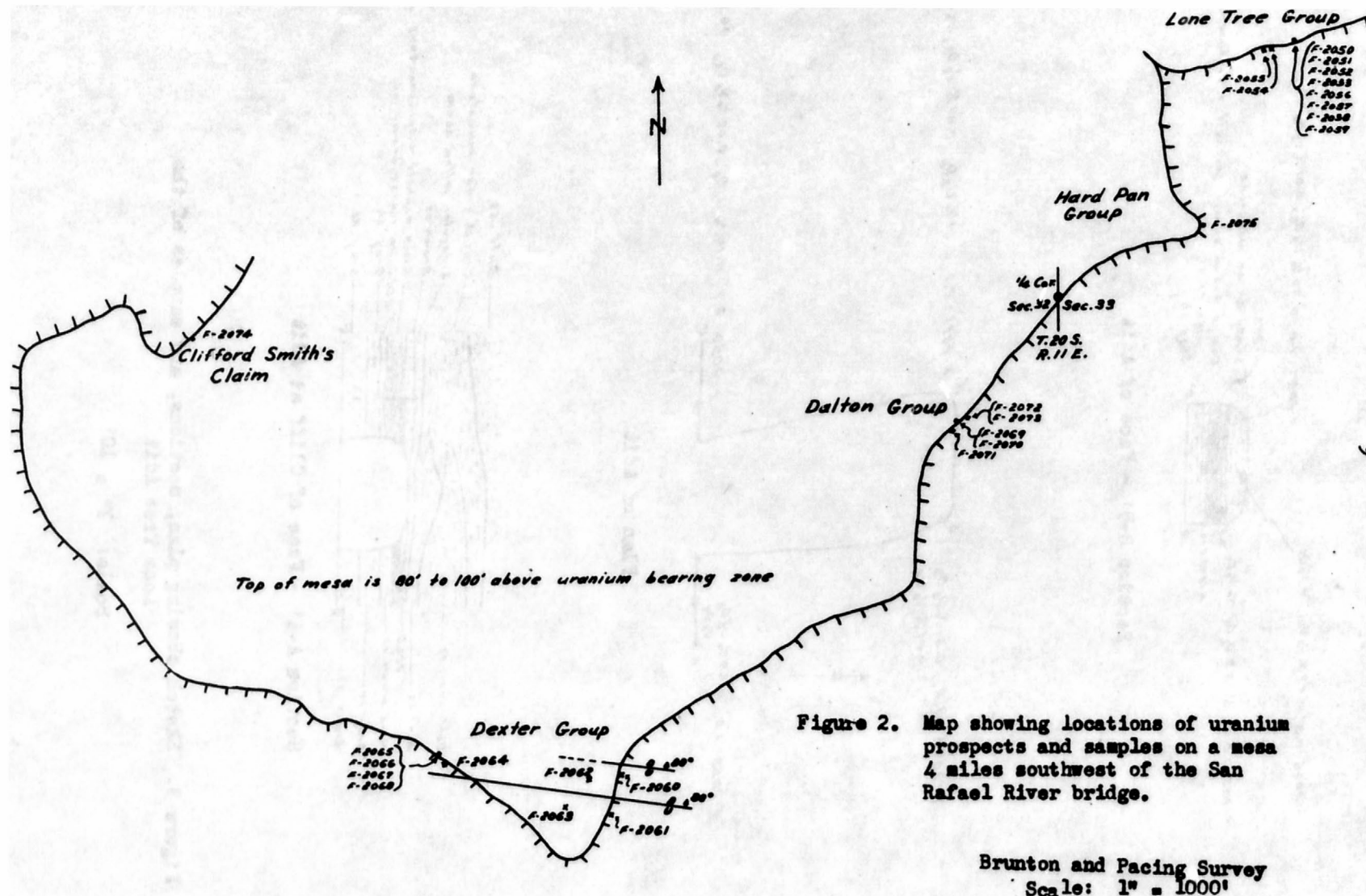
The individual deposits which were examined by the writer are described below. Each is located by corresponding number on Plate I.

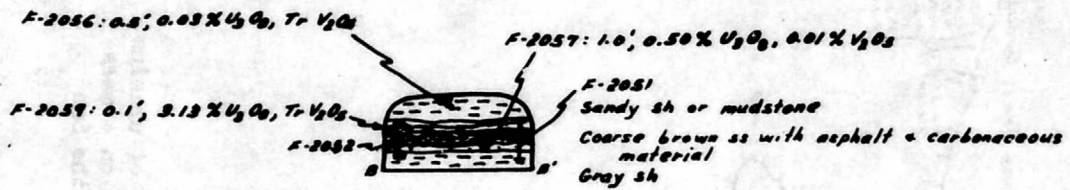
1. Lone Tree group.

This group consists of three claims in Sec. 23, T. 20 S., R. 11 E., about 3 miles southwest of the San Rafael River bridge. It was located in March, 1950. The owners are Russell Palmer, Huntington, Utah; Douglas Harrison, Orangeville, Utah; and Louis G. Albrechtson, Lonel Jones, and Theo Ungerman, all of Castle Dale, Utah. The property was examined in company with Messrs. Albrechtson, Palmer, and Jones.

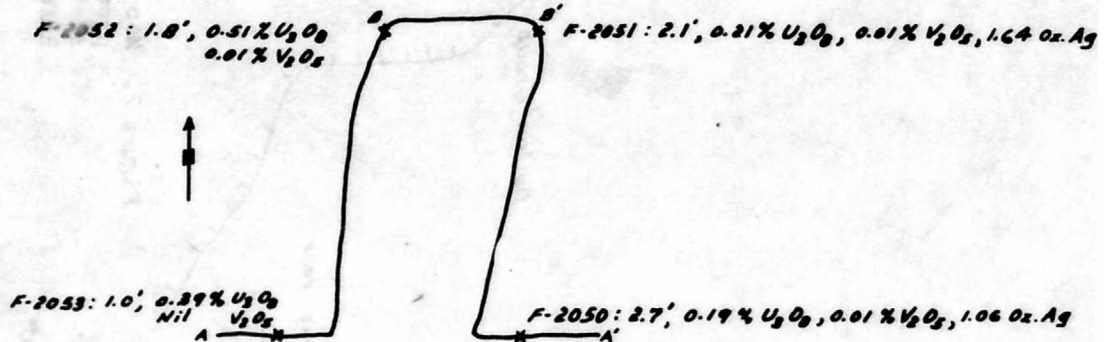
Development consists of an adit 18 feet long by 8 to 10 feet wide. The location of the group relative to nearby properties is shown in Fig. 2, and the sample locations with assays are shown in Fig. 3, as also the relationship of the ore zone to the stratigraphy.

The ore seam is covered by talus within a few feet on both sides of the mine entrance. It ends rather abruptly toward the east, since it cannot be found 50 feet to the east where rock exposures are good.

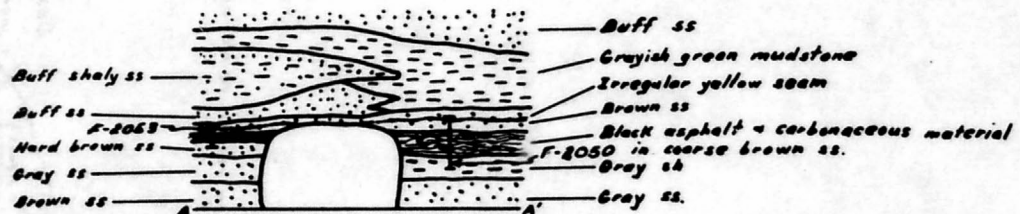




Section B-B' - Face of Adit



Plan of Adit



Section A-A' - Face of Cliff at Adit

Figure 3. Sketch showing plan, sections, and samples of the
Lens Tree Adit

Scale: 1" = 10'

The trend, or rake, of the thick part of this ore lens appears to be roughly north in the direction of the drift and the width and grade of the ore show very little change in the 18-foot adit. The ore lens lies within interfingering sandstones and shales. A short distance to the east the sandstones become conglomeratic. The zone of interfingering beds indicates changing conditions of deposition at this point and may have influenced the localization of ore, possibly because it is a more permeable zone.

The main ore zone is a brown, coarse sandstone 1 foot thick containing numerous closely spaced seams and blebs of asphalt, with a 1/16-inch seam of pyrite beneath. Below the pyrite is a gray shale mineralized for about 0.7 foot with blebs of asphalt. Above the main mineralized zone is a sandy shale or siltstone containing an irregular seam of autunite (?) averaging about 1 inch thick and carrying approximately 3 to 4 percent U_3O_8 . In the roof of the adit near the face are scattered "pellets" of asphalt, but these are too widely scattered to be of ore grade.

2. Hard Pan group.

This group consists of three claims to the southwest of and adjoining the Lone Tree group. It is owned by the same persons as those who own the Lone Tree, with addition of L. T. Hunter, Owen McClellhan, and Charles Magnuson, all of Castle Dale, Utah. Practically no work has been done on this group. One sample, No. F-2075,

cut across a thin seam containing carbonized tree limbs, assayed 0.06% U_3O_8 and a trace of V_2O_5 .

3. Dalton group.

This group lies to the southwest of the Hard Pan group in Sec. 32, T. 20 S., R. 11 E., a school section, and has been worked by the Dalton brothers of Cleveland, Utah. Development consists of an 18-foot adit and a few small cuts. About 20 cement sacks full of "ore" are on the property near the 18-foot adit. Fig. 4 shows the locations of samples taken and the assays. Radioactivity is measurable along a bed of gray shale for over 140 feet and along a conglomeratic sandstone lying on the shale for 90 feet. The beds are both well mineralized with blebs and seams of asphalt.

The 18-foot adit was driven beneath the mineralized shale bed in medium-grained gray sandstone. This sandstone contains numerous closely spaced seams of asphalt and some disseminated autunite (?). Over a width of 7.5 feet the face of the drift carries 0.05% U_3O_8 and no V_2O_5 .

4. Dexter group.

This group consists of seven claims in Sec. 5, T. 21 S., R. 11 E., lying southwest of the Dalton group on the point of the mesa. It is owned by Nolan Olsen, Harold Olsen, and Leonard Wilson, all of Wattis, Utah, who located it in the fall of 1949.

Development consists of a 33-foot adit with 15 feet of side drifting; the mine is not being worked at present. Fig. 5 shows the mine workings and location of samples on the southwest side of the point,

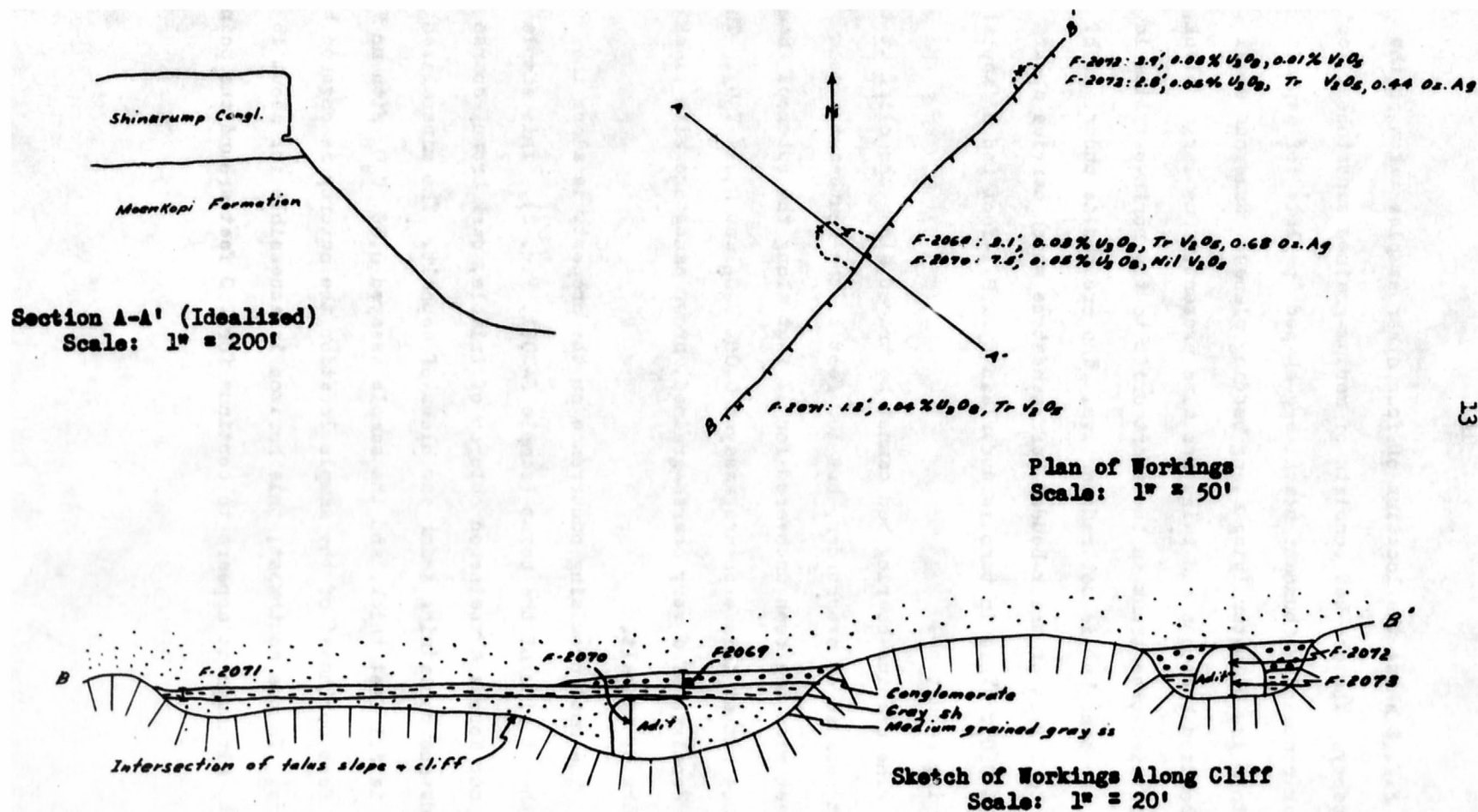


Figure 4. Plan and sections of Dalton Group showing sample locations and assays.

and Fig. 2 shows the location of four other samples taken on the property. The ore bed consists of medium-grained sandstone 2 feet thick containing abundant black, egg-shaped "pellets" of asphalt up to $\frac{1}{2}$ in. diameter lying along bedding planes. Numerous small carbonized branches and twigs are also present. One large, black, silicified tree trunk in the short drift to the northwest lies in the ore zone but is not radioactive. The ore bed is underlain by 2.5 to 3 feet of thick-bedded buff sandstone which carries about 0.03% U_3O_8 . This in turn is underlain by a 0.1-foot bed of asphalt-bearing sandstone.

The uranium-bearing bed cannot be traced along the cliff at the adit because of overburden, but 100 feet to the southeast a seam 4 feet wide has been uncovered for 12 feet along the outcrop. Sample F-2064 cut at this exposure assayed 0.06% U_3O_8 and 0.01% V_2O_5 . This bed consists of a very coarse-grained, brown sandstone with black specks of asphalt.

The most promising occurrence on the property is along the southeast side of the point (sample F-2061, Fig. 2). This sample was cut across a weathered outcrop of friable, dark brown, coarse sandstone containing seams and blebs of asphalt. The mineralized bed is 3.1 feet thick, and the sample assayed 0.36% U_3O_8 with no V_2O_5 . Ten feet northeast of the sample location the outcrop is covered by talus. To the southwest, this horizon is accessible for about 15 feet, although it appears to continue for 200 feet around the point;

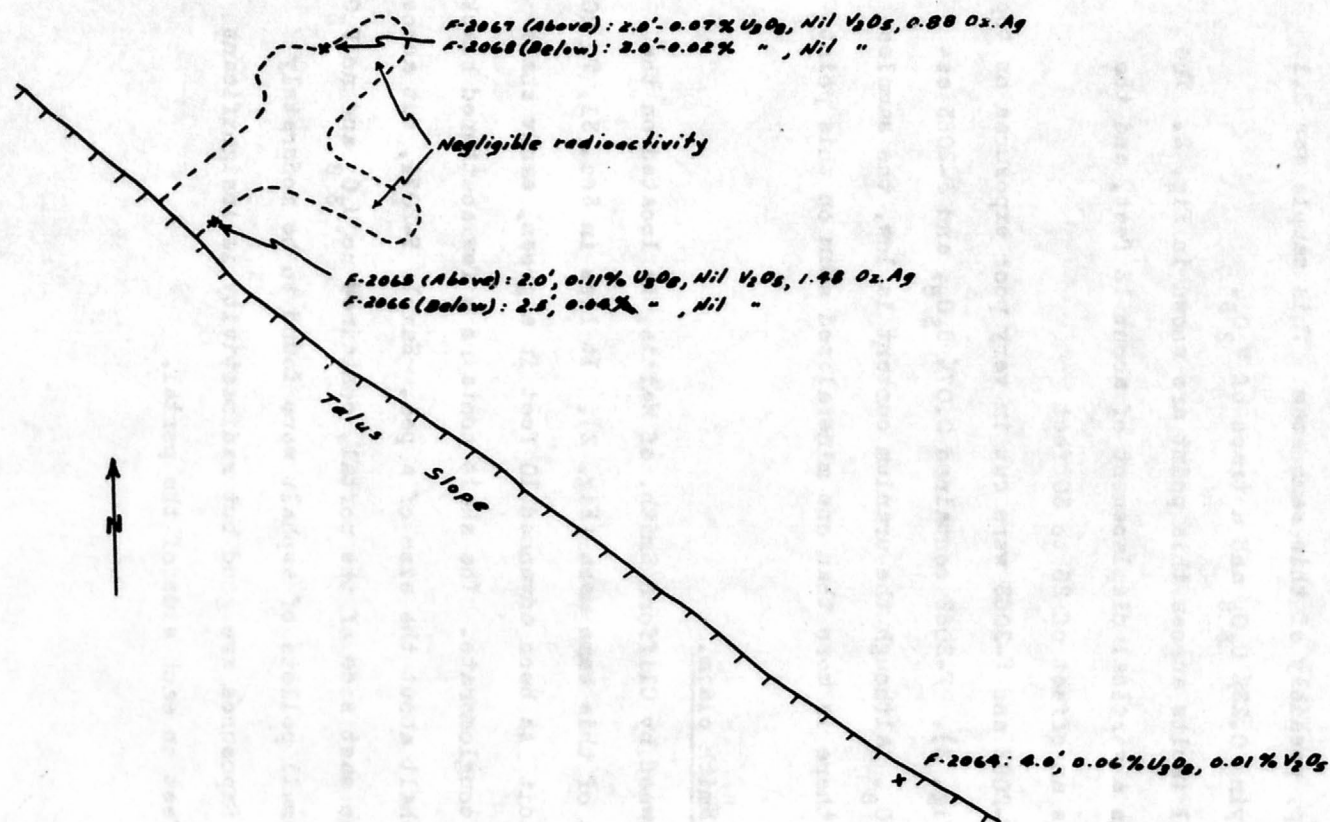


Figure 5. Plan of adit on Dexter Group showing sample locations and assays.

Scale: 1" = 20'

it could not be examined as it lies at least 20 feet above the slope. Sample F-2060, 300 feet north of F-2061, was cut across a poorly exposed outcrop, possibly of this same seam. This sample was 2.1 feet wide carrying 0.25% U_3O_8 and a trace of V_2O_5 .

Two normal faults across this point are shown in Fig. 2. The north fault has a vertical displacement of about 12 feet, and the south fault has an offset of 25 to 30 feet.

Samples F-2062 and F-2063 were cut in very poor exposures on top of the mesa (Fig. 2). F-2062 contained 0.07% U_3O_8 , and F-2063 assayed 0.03% U_3O_8 . Although the uranium content is low, the samples indicate that there is more than one mineralized seam on this point of the mesa.

5. Clifford Smith claim.

A claim owned by Clifford Smith, of Wattis, is located on the northwest side of this same mesa (Fig. 2). It lies in Sec. 31, T. 20 S., R. 11 E. An adit has been advanced 10 feet in a green, sandy shale lying below a conglomerate. The shale contains a few scattered black pellets of asphalt about the size of a pea. Sample F-2074, cut across 5.5 feet at the east side of the portal, contained no U_3O_8 and no V_2O_5 , although the small pellets of asphalt were found to be moderately radioactive. Exposures are good but radioactivity is insignificant for over 100 feet on each side of the portal.

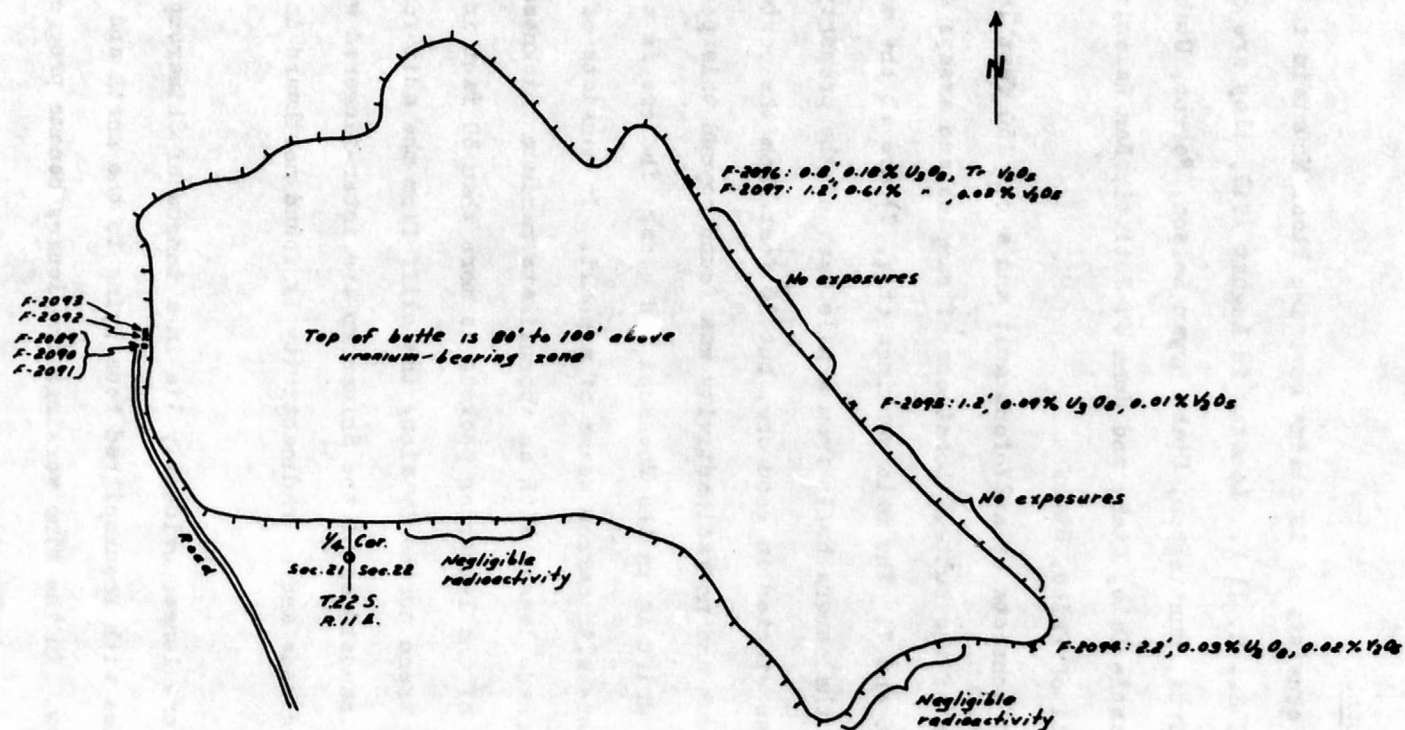
6. Wickiup group.

This group consists of 19 claims covering Block Mountain in Secs. 21 and 22, T. 22 S., R. 11 E. Located in August 1949, they are owned by Charles Pettitti, Huntington, Utah; Bryan Nelson, Ferron, Utah; Russell Snow, Castle Dale, Utah; and John J. Pettitti, Ben Hulen, and T. N. Jensen, all of Price, Utah.

Development consists of a 27-foot adit and a cut 150 feet long on the west side of the butte. Locations of samples and assays are shown on Figs. 6 and 7. The main workings (Fig. 7) are at the end of a road which the owners built from a mile east of the property.

The adit was started in good ore, but 10 feet from the portal the ore lensed out and no radioactivity was found beyond this point. The face of the drift is in the Moenkopi red beds. The ore is composed of sandstone with narrow seams of asphalt. It consists of a series of high-grade lenses with an approximate maximum thickness of two feet. None of the lenses or pockets is more than 30 feet in diameter. They trend northerly along the cliff from the adit for 200 feet. Here the sandstones of the Shinarump are inter-fingered with the Moenkopi red beds and no radioactivity is found northward in the Moenkopi.

The small ore lenses evidently lie in a tongue of Shinarump sandstones and shales with Moenkopi red beds lying to the north and east, as well as below. In the mine workings the lenses become progressively thinner or end abruptly.



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Figure 6. Sketch of Block Mountain showing locations of samples on Wickiup Group.

Scale: 1" = 1000'

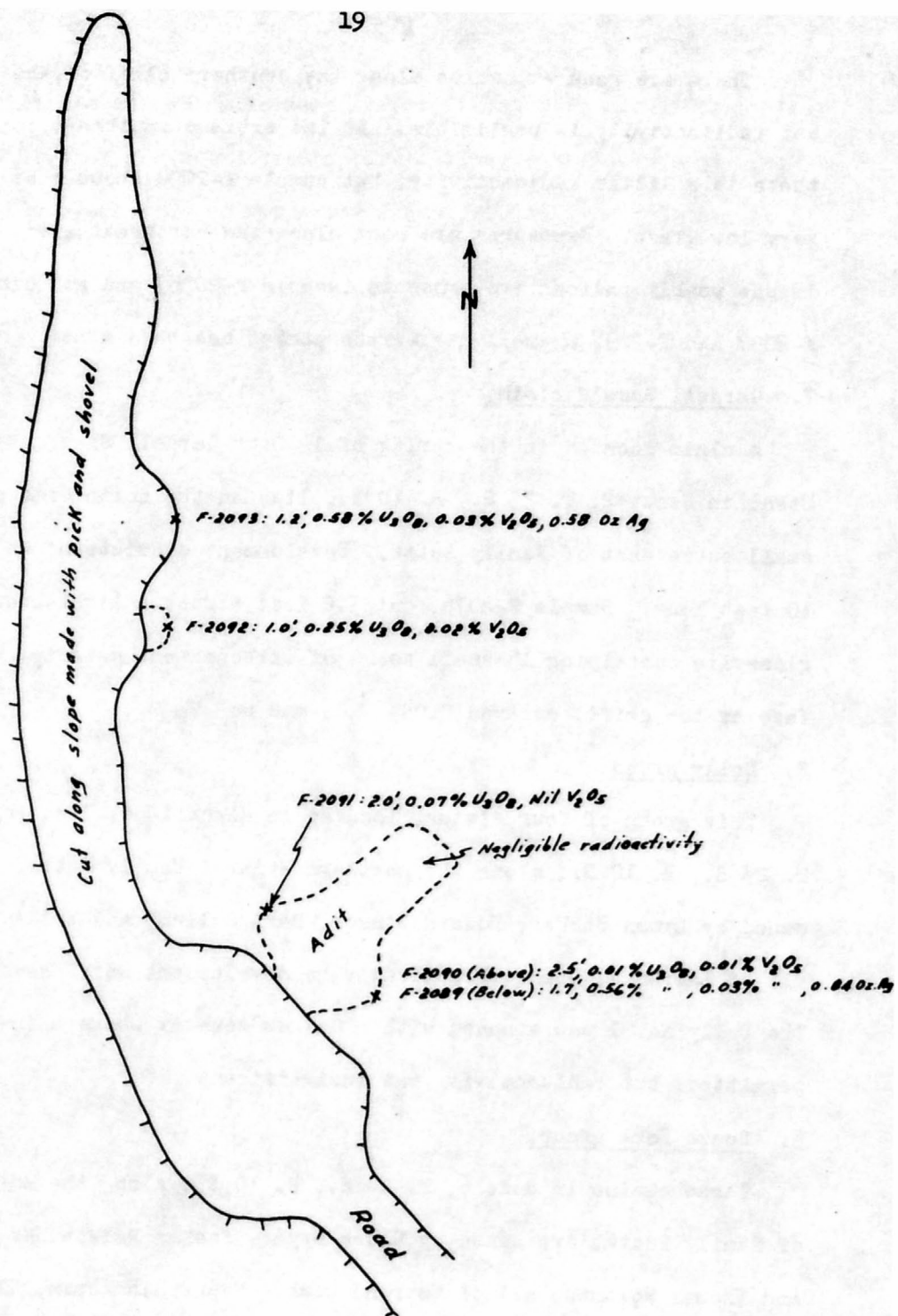


Figure 7. Sketch showing sample locations and assays in main workings of Wickiup Group on the west side of Block Mountain.

Scale: 1" = 20'

There are good exposures along the southern cliff of the butte but radioactivity is negligible. At the extreme southeast point there is a little radioactivity, but sample F-2094 shows that it is very low grade. Exposures are poor along the northeast side; there is one weakly radioactive exposure (sample F-2095) and at points F-2096 and F-2097 a small high-grade pocket has been mined.

7. Gardell Snow's claim.

A claim located in the spring of 1950 by Gardell Snow, of Ferron, Utah, in Sec. 32, T. 23 S., R. 10 E., lies on the north side of a small butte east of Family Butte. Development consists of an adit 10 feet long. Sample F-2076, cut 3.2 feet across a light-brown conglomerate containing 15 small seams of carbonaceous material in the face of the drift, assayed 0.04% U_3O_8 and no V_2O_5 .

8. Dolly group.

This group of four claims, located in March 1950, lies in Sec. 31, T. 23 S., R. 10 E., along the northern side of Family Butte. It is owned by Lyman Staker, Howard Staker, Mart Cullum, and Wallace Jensen, all of Lawrence, Utah. Practically no development work has been done. The Dolly No. 1 was scanned with a Geiger counter where a few outcrops permitted, but radioactivity was insignificant.

9. South Fork group.

Three claims in Sec. 6, T. 24 S., R. 10 E., along the north side of Family Butte, are owned by Elden Bryan, Foster Nelson, Ervin Olsen, and Thomas Worthen, all of Ferron, Utah; Frank Blackburn, Clawson, Utah; and Lyman Staker, Lawrence, Utah. Practically no development

work has been done and no appreciable radioactivity was found for several hundred feet along the ledge where exposures are good.

10. Hertz No. 1 claim.

This claim, in the SE $\frac{1}{4}$ of Sec. 30, T. 23 S., R. 10 E., along the east side of the mesa north of Family Butte, is owned by Lyman Staker, Howard Staker, Mart Cullum, and Wallace Jensen, all of Lawrence, Utah. It was located in April 1950.

Development consists of a cut 12 feet long which extends 4 feet into the hill. The uranium-bearing seam, about 1 foot wide, consists of a brown sandstone bed 0.4 foot wide with numerous small seams of black asphalt, and about 0.6 foot of green shale or mudstone containing a green, earthy, highly radioactive uranium mineral along bedding planes. Samples F-2077 and F-2079 were cut across this ore seam 8 feet apart, and average 0.70% U_3O_8 and a trace of V_2O_5 . A 1-foot sandstone bed just above the ore contains 0.01% U_3O_8 . A little radioactivity can be traced along the overburden to the south of the cut for at least 200 feet, but nowhere is the ore horizon exposed in this distance.

11. Pay Day claim, Green Vein group, and Brown Throne group.

These properties consist of 30 adjoining claims on a mesa 2 miles north of Family Butte, in Secs. 19, 20, 29, and 30, T. 23 S., R. 10 E.; they were located in the spring of 1950. The Pay Day claim is owned by Elden Bryan and Foster Nelson of Ferron, Utah. The Green Vein and Brown Throne groups are owned by Elden Bryan, Foster Nelson, Ervin Olsen, and Thomas Worthen, all of Ferron, Utah; Frank Blackburn,

Clawson, Utah; and Lyman Staker, Lawrence, Utah.

Development has been done on only three claims of the group -- the Pay Day claim, the Green Vein No. 3, and the Green Vein No. 4.

The Pay Day claim is developed by a cut 40 feet long and by two 5-foot adits. Figs. 8 and 9 show samples, assays, and stratigraphy. The ore consists of a thin bed of sandy conglomerate containing numerous small black seams and blebs of asphalt, and a few black carbonized tree limbs, as well as some green and blue oxidized copper minerals. The copper content increases toward the base of the seam. Samples F-2099 and F-2102 indicate an average of 0.35% U_3O_8 , 0.04% V_2O_5 , 0.71% Cu, 0.60 oz. Ag, and 31.8% $CaCO_3$ for a thickness of 0.7 foot and an exposed length of 18 feet. To the north and to the south this seam is lower in grade. It is overlain by a limey conglomerate which contains a few thin seams of carbonaceous material. The conglomerate contains 0.28% U_3O_8 at point F-2103, but is lower-grade elsewhere. An arithmetic average of four samples of this conglomerate shows that it contains about 63.0% $CaCO_3$. Sample F-2106 was obtained about 200 feet west of F-2103 across a dry wash. It represents a thickness of 1.7 foot in the face of an adit. The material sampled consists of somewhat conglomeratic brown sandstone containing short lenses of gray mudstone and some thin, black seams of asphalt.

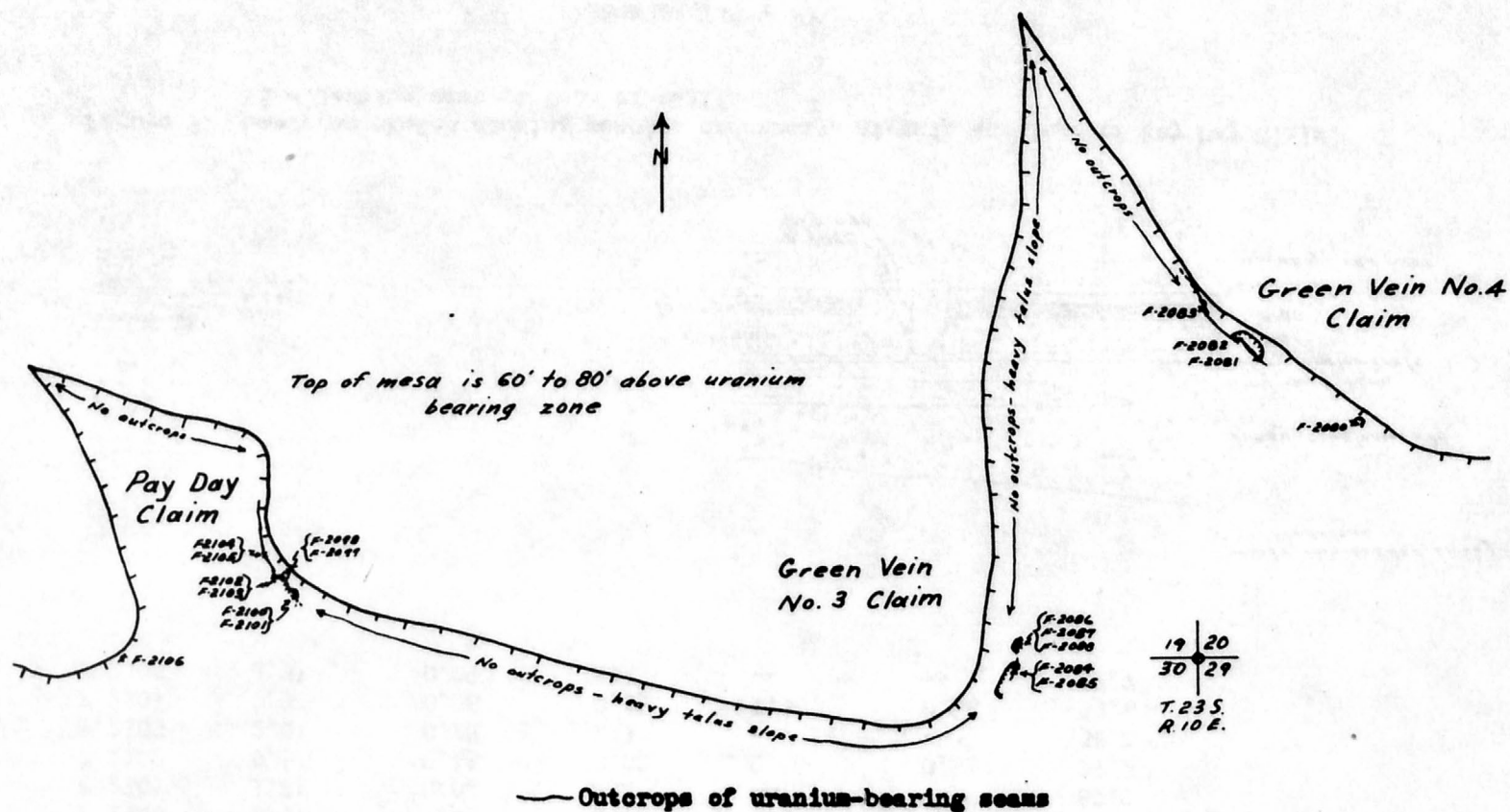


Figure 8. Map of Green Vein Nos. 3 and 4 and Pay Day Claims showing location of workings and samples.

Brumton and Pacing Survey
Scale: 1" = 200'

	<u>Width</u>	<u>% U₃O₈</u>	<u>% V₂O₅</u>	<u>% Cu</u>	<u>On Ag</u>	<u>% CaCO₃</u>
F 2098	2.0'	0.01	Nil	--	--	64.8
F 2099	0.8'	0.27	0.05	0.76	0.56	36.4
F 2100	0.7'	0.05	0.01	0.40	0.64	42.3
F 2101	1.8'	0.04	Nil	--	--	67.2
F 2102	0.6'	0.45	0.02	0.66	0.64	27.2
F 2103	2.0'	0.28	Nil	--	--	58.2
F 2104	0.3'	0.08	0.03	1.36	0.64	37.4
F 2105	1.3'	0.09	Nil	--	--	62.7

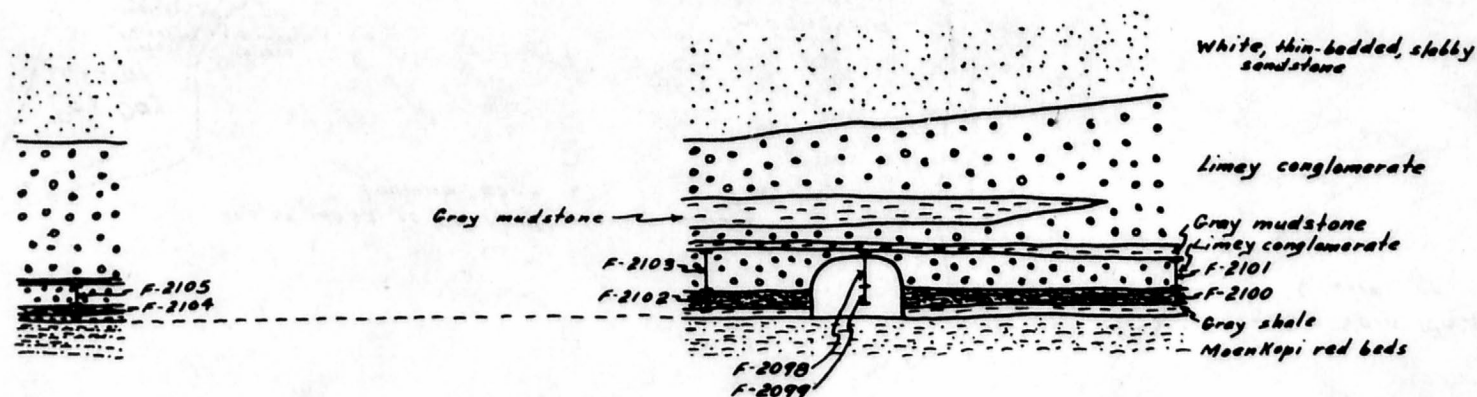


Figure 9. Geologic sketch showing samples and assays at main workings of Pay Day Claim.
View looking east at face of cliff.

Scale: 1" = 10'

This sample assayed 0.13% U_3O_8 , 0.62% V_2O_5 , and 13.5% $CaCO_3$. Heavy talus prevented tracing the vein in either direction from the adit.

The Green Vein No. 3 group is located 800 feet east of the Pay Day claim (Fig. 8). Development consists of one cut 48 feet long by 10 feet wide, and one cut 14 feet long by 8 feet wide. The long cut was made in beds above the vein except at the northeast corner where a very thin copper-uranium seam 0.1 foot thick is exposed. Sample F-2085 shows that this seam assays 0.88% U_3O_8 and 0.04% V_2O_5 . Much metatorbernite was observed here with malachite, azurite, and probably other oxidized copper minerals. A coarse, brown sandstone above this seam assays only 0.03% U_3O_8 over a width of 1.2 foot. Eighteen feet to the north this copper-uranium band is 0.4 foot wide and assays 0.59% U_3O_8 and 0.02% V_2O_5 ; the beds overlying it carry less than 0.06% U_3O_8 .

On the Green Vein No. 4 claim, three small cuts have exposed a thin bed from 0.7 to 0.8 foot thick, containing black asphalt, for a length of about 100 feet. This uranium-bearing body lies on the Moenkopi red beds. On the southeast exposure it is overlain by shaly mudstone which grades into white, medium-grained sandstone to the northwest. Sample F-2083 (Fig. 8) assayed 1.18% U_3O_8 and a trace of V_2O_5 ; samples F-2082 and F-2081 assayed 0.02% U_3O_8 and sample F-2080 assayed 0.21% U_3O_8 .

12. Dirty Devil group.

This group consists of about 15 claims covering a butte beside the Muddy River in Secs. 26 and 35, T. 24 S., R. 8 E. (unsurveyed). It is owned by William J. Hannert, Orangeville, Utah; John Tomsich, Columbia, Utah; and Rex Bunderson, Emery, Utah. The claims were located in April 1950. Fig. 10 shows the general location of samples taken on the Dirty Devil No. 2 and the Dirty Devil No. 4, the only claims on which development work has been done.

On the Dirty Devil No. 2 claim, an adit 18 feet long by about 15 feet wide has been driven on a zone 1 foot thick consisting of a gray shale overlain by a thin, brown, coarse sandstone and mineralized with black seams and irregular blebs of asphalt. Near the bottom of the zone there are some green and greenish-yellow uranium minerals along bedding planes.

Fig. 11 shows the location of the four samples taken. These samples averaged 1 foot thick, 0.73% U_3O_8 , and 0.40% V_2O_5 over an exposed length of 180 feet. The ore is continuous at about this same thickness and grade to the west for 80 feet; here it becomes thinner, and at about 150 feet west of point F-2116 it follows cross-bedding in a sandstone and terminates against the Moenkopi red beds. To the east it continues beyond F-2113 for about 40 feet at the same thickness. At 150 feet east of F-2113 it is about 0.2 foot thick.

Development on the Dirty Devil No. 4 claim consists of an adit 32 feet long which has been widened to 14 feet at the face. The adit is about 4.5 feet high. Fig. 12 shows the workings, the samples taken, and the succession of beds.

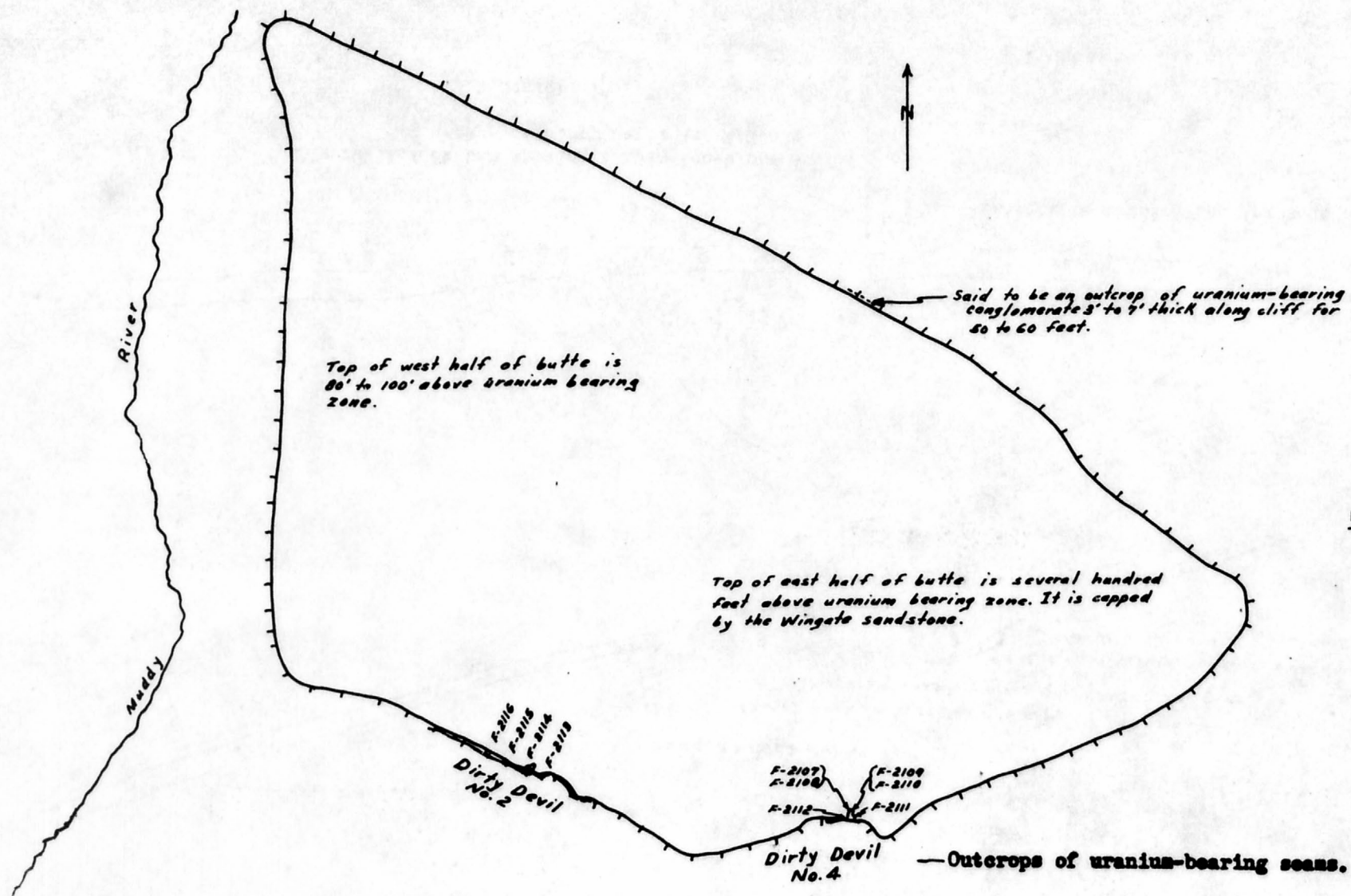


Figure 10. Sketch showing approximate locations of workings and samples on the Dirty Devil Group, Emery County, in T.24S., R.8E.

Scale: 1" = 500'

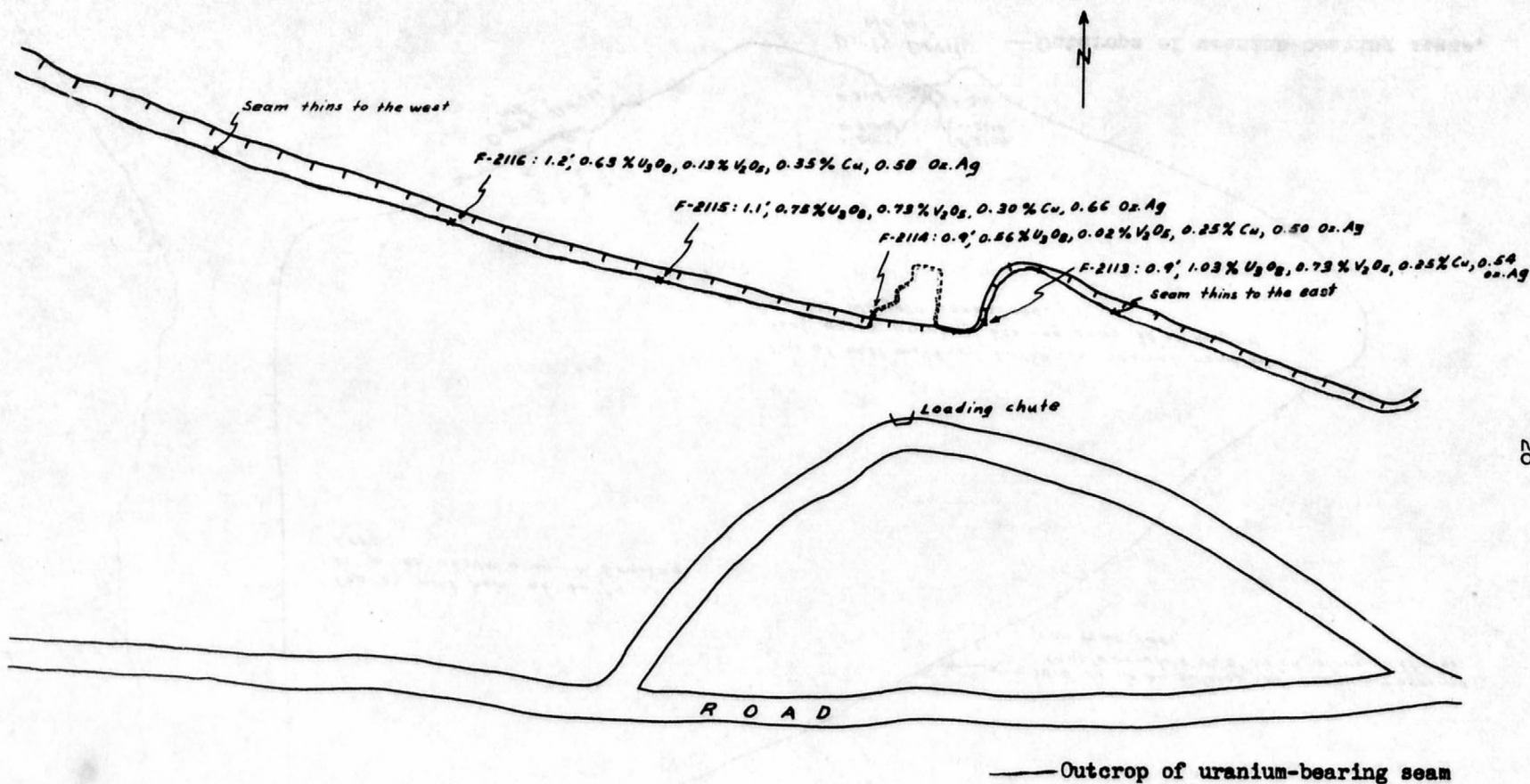
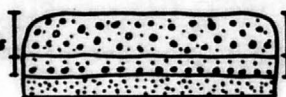


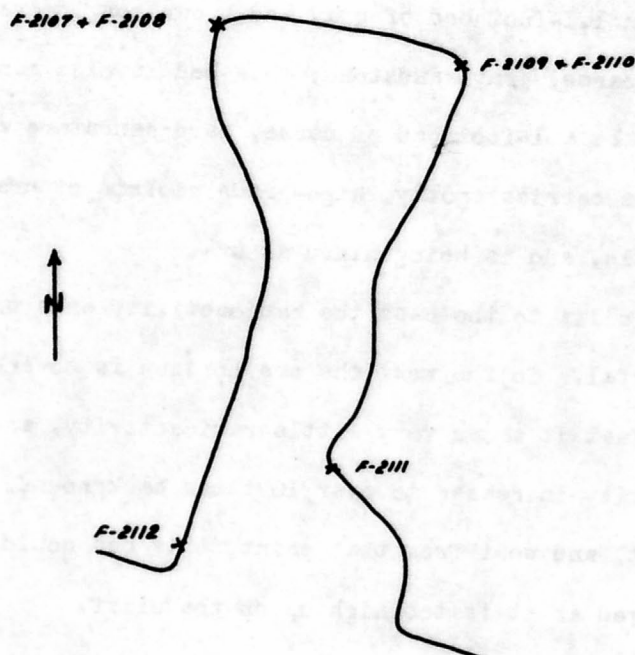
Figure 11. Sketch showing sample locations and assays on Dirty Devil No. 2 Claim.

Scale: 1" = 50'

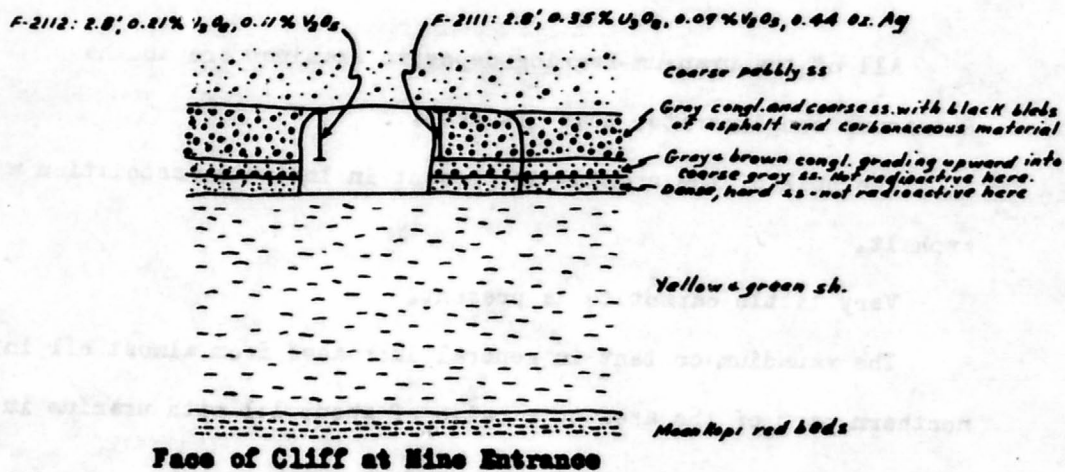
F-2107: 2.4', 0.22% U_3O_8 , 0.60% V_2O_5
 F-2108: 0.9', 0.00% " , 0.11% "
 F-2109: 2.6', 0.15% U_3O_8 , 0.05% V_2O_5
 F-2110: 1.1', 0.15% " , 0.05% "
 Bottom bed not sampled.



Face of Adit



Plan of Adit



Face of Cliff at Mine Entrance

Figure 12. Sketch showing plan, sections, and samples of the Dirty Devil No. 4 adit.

Scale: 1" = 10'

The main ore seam is a 2.5-foot bed of sandy, rather loosely consolidated conglomerate with pebbles up to 3/4-in. diameter, and mineralized with small, irregular blebs of asphalt. Below the conglomerate lies a 1.1-foot bed of gray and brown conglomerate grading upward into a coarse, gray sandstone; this bed is also mineralized. It is underlain by a 1-foot bed of dense, hard sandstone which Mr. Hannert says carries spotty, high-grade pockets of uranium and vanadium minerals, and is being mined as ore.

Along the cliff to the east the radioactivity ends within 5 feet of the adit portal. To the west the ore horizon is covered near the portal; at 20 feet it shows very little radioactivity, and at 100 feet radioactivity increases to over 10 times background. Between 20 and 100 feet, and west from that point, this bed could not be directly observed as it is too high up on the cliff.

SUMMARY AND CONCLUSIONS

All of the uranium-bearing deposits examined are in the Shinarump conglomerate, near its base.

The bulk of the uranium is present in intimate association with asphalt.

Very little carnotite is present.

The vanadium content in general increases from almost nil in the northern part of the area to a ratio of about 1:1 with uranium in the

southern part. The distribution of vanadium within an individual deposit, however, may be very erratic.

Silver is distributed fairly uniformly throughout the ore horizon of the area. Thirty-two samples from the various properties range from 0.44 to 1.64 ounce per ton, and average about 0.70 ounce per ton. There does not appear to be any direct relationship between silver content and uranium, vanadium, or copper content.

The uranium mineralization appears to have been introduced laterally along bedding planes and other permeable zones and probably is not syngenetic. However, at this stage there is no conclusive evidence to indicate the mode of origin of the deposits.

The best prospects examined are in areas that lie within a few thousand feet of major faults.