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AIRBORNE RECONNAISSANCE SURVEY OF NORTHWESTERN ARIZONA (ARIZONA STRIP) AND SOUTHWESTERN UTAH

RNE - 2017

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RME-2017

UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF RAW MATERIALS
SALT LAKE EXPLORATION BRANCH

AIRBORNE RECONNAISSANCE SURVEY OF NORTHWESTERN ARIZONA (ARIZONA STRIP) AND SOUTHWESTERN UTAH

by

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August 1954
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ABSTRACT

From December 1953 to May 1954 an extensive airborne reconnaissance program was conducted in northwestern Arizona (Arizona Strip) and southwestern Utah. Five surface anomalies were detected, one of which has possible commercial value. All anomalies are within the boundaries of National Park Service jurisdiction, consequently, this report is not for public distribution until clearance is obtained from the National Park Service.

A preliminary airborne reconnaissance program was also conducted in the Richfield area. No anomalies were discovered.

INTRODUCTION

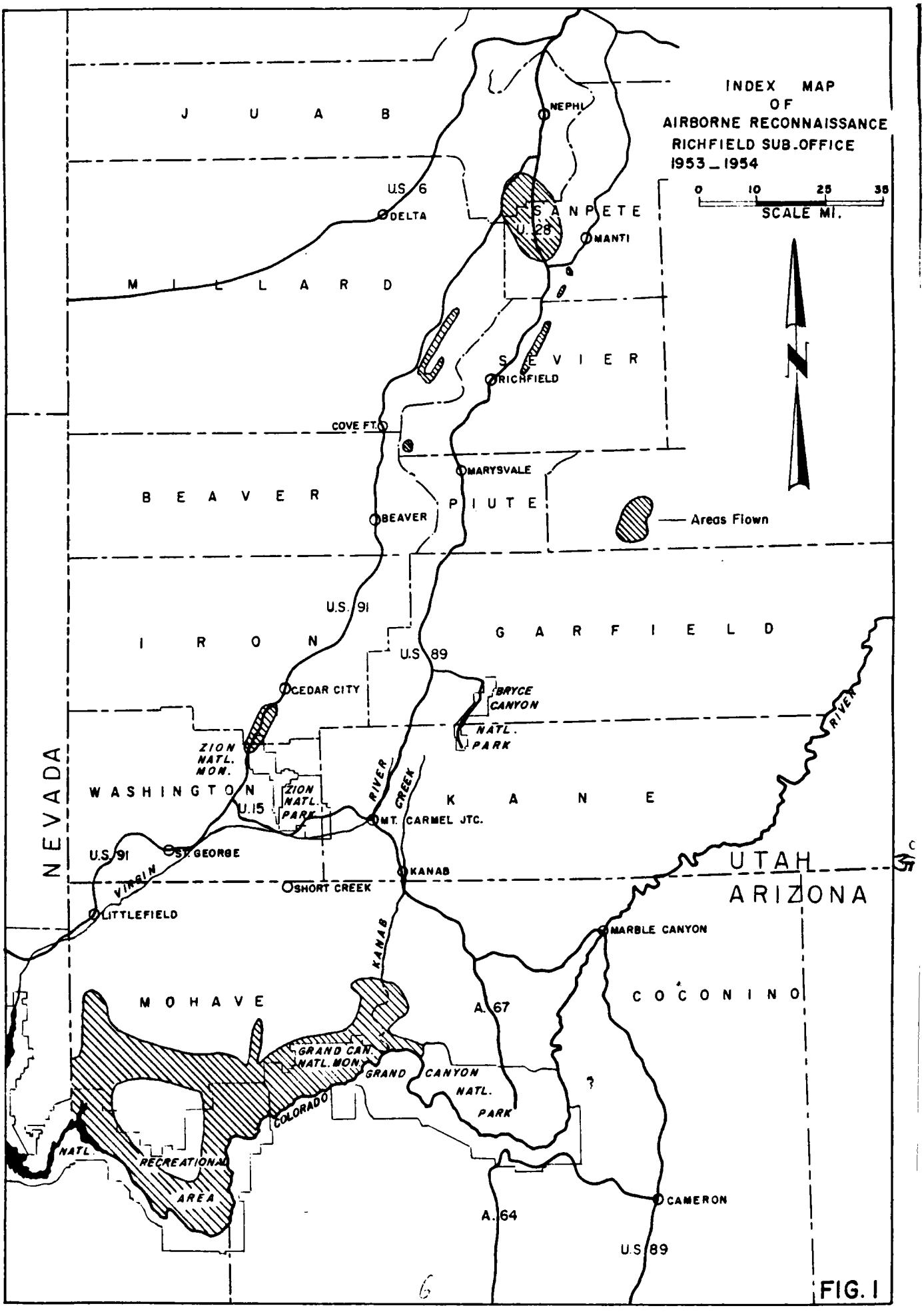
Listed below are the areas examined during this project. Figure 1 shows the general region and, in shading, the portions included in this examination.

Richfield Area:

Pavant Range
Kimberly Area
Gunnison Plateau
Western edge of Wasatch Plateau

Only limited preliminary airborne reconnaissance was done in the Richfield Area (see Figure 2) and will not be discussed in this report. All results were negative.

A more detailed program is being planned for this area and will be executed next year.


INDEX MAP
OF
AIRBORNE RECONNAISSANCE
RICHFIELD SUB-OFFICE
1953 - 1954
0 10 25 35
SCALE MI.
Areas Flown
JUAB
MILLARD
SANPETE
SEVIER
BEAVER
PIUTE
GARFIELD
IRON
WASHINGTON
KANE
NEVADA
UTAH
ARIZONA
COCONINO
MOHAVE
NEPHI
DELTA
MANTI
RICHFIELD
COVE FT.
MARYSVALE
BEAVER
CEDAR CITY
BRYCE CANYON NATL. PARK
ZION NATL. MON.
ZION NATL. PARK
MT. CARMEL JCT.
ST. GEORGE
SHORT CREEK
KANAB
LITTLEFIELD
MARBLE CANYON
CAMERON
U.S. 6
U.S. 28
U.S. 91
U.S. 89
U.15
A. 67
A. 64
VIRGIN RIVER
KANAB CREEK
COLORADO RIVER
GRAND CAN. NATL. MON.
GRAND CANYON NATL. PARK
NATL. RECREATIONAL AREA

6

FIG. 1

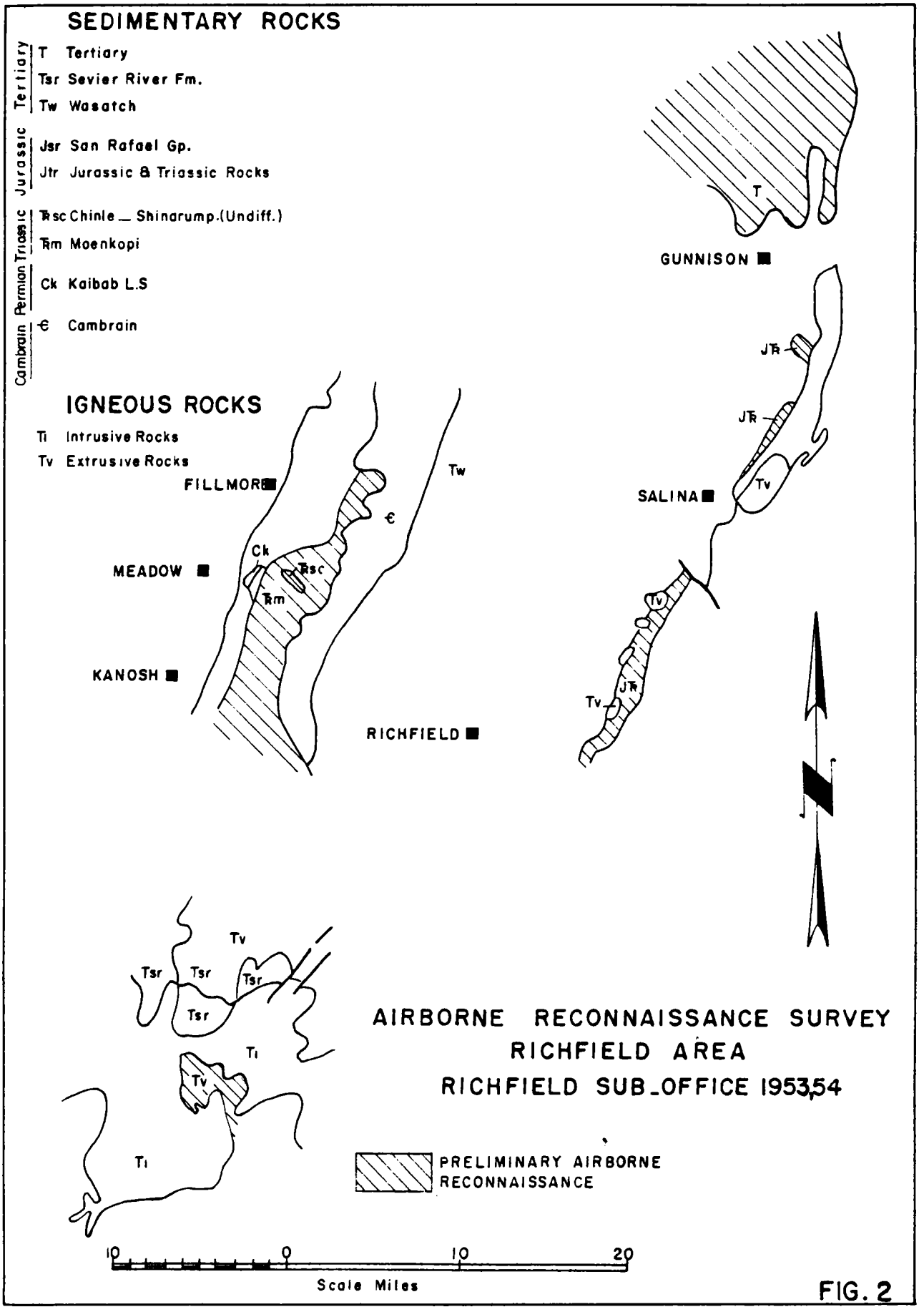

SEDIMENTARY ROCKS
Tertiary
T Tertiary
Tsr Sevier River Fm.
Tw Wasatch
Jurassic
Jsr San Rafael Gp.
Jtr Jurassic & Triassic Rocks
Permian Triassic
Trsc Chinle _ Shinarump.(Undiff.)
Trm Moenkopi
Ck Kaibab L.S
Cambrain
€ Cambrain
IGNEOUS ROCKS
Ti Intrusive Rocks
Tv Extrusive Rocks
GUNNISON
FILLMORE
MEADOW
KANOSH
RICHFIELD
SALINA
AIRBORNE RECONNAISSANCE SURVEY
RICHFIELD AREA
RICHFIELD SUB_OFFICE 1953,54
PRELIMINARY AIRBORNE RECONNAISSANCE
10 0 10 20
Scale Miles

FIG. 2

St. George Basin - Arizona Strip Area:

Included here, as is shown on Figure 3, is everything north of the Colorado River, east of the Nevada-Arizona and Nevada-Utah state lines, south of the approximate latitude of Cedar City and west of the Paria River. In the course of the project no operational flying was attempted east of Kanab Creek. Although some flying was attempted in the St. George Basin and nearby areas, no rim flying was attempted north of the approximate latitude of Diamond Butte near Mt. Trumbull, Arizona because abnormally high radioactivity existed in the area due to cloud fall-out from the atomic bomb experiments in Frenchman's Flat, Nevada (see Figure 3). The areas actually flown in the St. George Basin-Arizona Strip Area are shown in Figure 3; shadings are in accord with proportional coverage requested and given in the examination.

Operational flying began in the Utah-Arizona region on November 6, 1953 and ended May 28, 1954. During this project the following flying time was accumulated:

Rim and grid:	164 hours	10 minutes
Reconnaissance:	123 hours	35 minutes
Cross-country:	178 hours	10 minutes
Total:	465 hours	55 minutes

Rim and grid flying includes all flying where aerial radiometric examination is made over specified areas. Reconnaissance flying constitutes that flying time during which the observer, ground check geologist, regional geologist, or official visitors have been flown in the area. Cross-country time constitutes all that time necessary to fly to and from the areas being examined, all operational flights necessary for

the functioning of the unit and such flying time required to transport official personnel in business associated with the airborne work.

Radioactive materials have been found, examined, and exploited in a number of localities in this region. These localities are listed as follows:

Orderville Gulch district (Salina Mining Company)

Leeds District (Old Silver Reef-Harrisburg mining district)

Hack's Canyon Mine

Copper Mountain district (including the Copper Mountain mine, Copper House claims, Chapel claims, and across the Colorado River, the Ridenour mine)

Anomalies found in the Sanup Plateau and in the Hurricane Fault.

Several small prospects and old mines.

Ground examination of almost all the claims, prospects, abandoned and producing mines has been done by Commission geologists from the Richfield Sub-Office.

Previous airborne work sponsored by the Commission in southern Utah and northwestern Arizona was limited to a few weeks work in 1953 during which Shinarump outcrops were flown between Kanab and St. George. This work was terminated by explosion of the atomic bombs in Frenchman's Flat in March of 1953, after which abnormally high background precluded aerial radiometric examinations in this region. Some private airborne work has been performed in the region, but the extent and conclusions derived are unknown to the authors.

Copper, iron, silver, some coal, very little oil, and minor amounts of uranium have been produced in the region.

The authors wish to thank the U. S. Geological Survey for permission to use one of their contracted helicopters in the examination of the anomalies in the Sanup Plateau; the National Park Service and the Bureau of Land Management for permission to reconnoiter areas under their jurisdiction. The pilot and observer wish also to thank Mr. Glen Haren, operator of the St. George airport, for his efforts in searching for them after their accident in Arizona.

PHYSIOGRAPHY

The area flown in northwest Arizona is a broad plateau cut by north-south striking normal faults whose escarpments are prominent physiographic features of the area. This plateau topography has been incised by south-flowing Colorado River tributary drainage which forms deep canyons and erosional remnants such as mesas and ledges. This area has many karst topographic features such as sinks, caverns, and solution depressions displayed in wide areal extent and also aligned along fractures. The plateau is abruptly terminated by the Grand Wash Cliffs and the Virgin River on the west and by the Colorado River on the south.

Most of the flat plateaus are accessible from St. George, Utah, by secondary dirt roads, but the majority of the steep-walled canyons are inaccessible except by foot. A few canyons can be reached by rough roads which are often washed out and completely impassable without rebuilding by blasting and bulldozer.

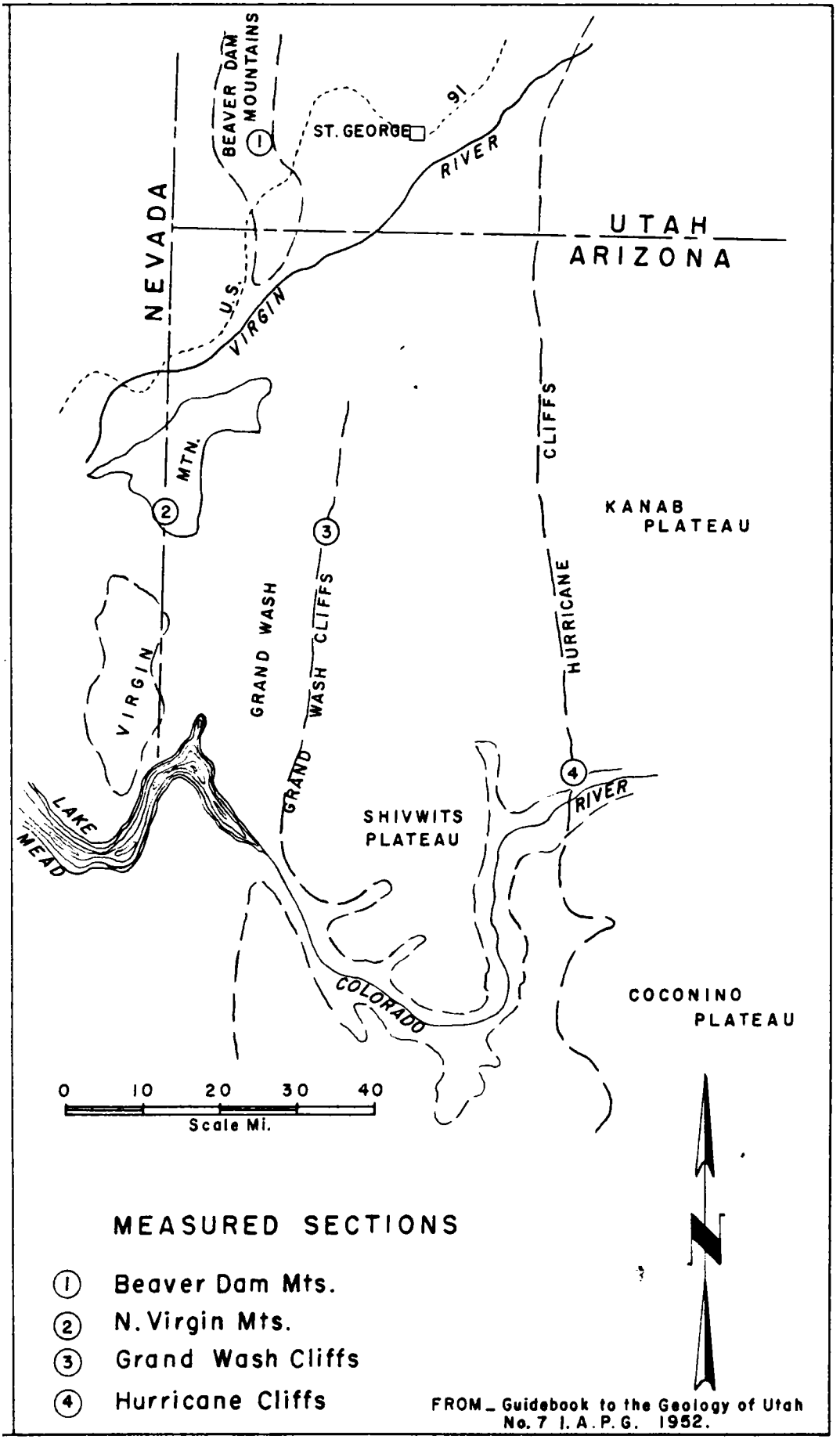
The elevations range from 1,300 feet to over 7,000 feet. Vegetation is sparse consisting of pinons, scrub oak, sage, and pines. On the higher mesas of the Shivwits Plateau commercial growth of pine are felled and milled. Grass is not abundant, but cattle are grazed throughout the area. The area is semi-arid, surface water is almost non-existent and most streams are arroyos. A few springs are found in the deeper canyons. The annual temperature differential is extreme; it may drop below zero in the winter and reach as high as 110° in the summer.

Vertical Sinuous Lines — Not Exposed or Eroded

ERA	PERIOD	① * BEAVER DAM MTS. (S S REBER)	② * N. VIRGIN MTS. MTS. (McNAIR)	③ * GRAND WASH CLIFFS (McNAIR)	④ * HURRICANE CLIFFS (McNAIR)
CENOZOIC	QUATERNARY			Volcanics	Volcanics
	TERTIARY				
MESOZOIC	CRETACEOUS				
	JURASSIC	Navajo S.S.			
	TRIASSIC	Chinle Formation: Duffin S.S. / Tecumseh S.S. / Leeds S.S. / Trail Hill / Fire Clay / Hartley S.S. & SH.	Chinle F M. (Undifferentiated)	Chinle F M. (Undifferentiated)	
		Shinarump	Shinarump	Shinarump	
		Moenkopi Formation: U. Red Mem. / Shnabkaib / M Red Mem. / Virgin LS. / L Red Mem. / Timpoweap	Moenkopi FM. (Undifferentiated)	Moenkopi F M. (Undifferentiated)	
PALEOZOIC	PERMIAN	Kaibab LS.	Kaibab LS.	Kaibab LS.	Kaibab LS.
			Toroweap FM.	Toroweap FM.	Toroweap F M.
		Coconino S.S.	Coconino S.S.	Coconino S.S.	Coconino S.S.
		Supai S.S.	Hermit SH.	Hermit SH.	Hermit SH.
			Queantoweap	Queantoweap	Supai S.S.
			Pakoon LS.	Pakoon LS.	
	PENNSYLVANIAN	Callville LS.	Callville L S.	Callville LS.	Callville LS. / Supai
	MISSISSIPPIAN	Rogers Spgs LS.	Rogers Spgs LS.	Redwall LS.	Redwall L S.
	DEVONIAN	Muddy Peak LS.	Muddy Peak LS.		Martin LS.
	SILURIAN				
	(ORD?) CAMBRAIN	Undivided Cambrain	Dol. L S.		Dol. LS.
			Peasley LS.		Muav L S.
			Chisholm SH.		
			Lyndon LS.		
		Pioche SH.	Pioche SH.		Bright Angel SH.
		Prospect Mtn. Qtz.	Prospect Mtn. Qtz.		Tapeats S.S.
PRE CAMBRIAN	PRE-CAMBRAIN	Gneiss Schist Granite	Intrus. Granite & Diabase		
			Gneiss Schist Granite		

* See Index Map Opposite

STRATIGRAPHIC COLUMM OF AREA



INDEX MAP OF MEASURED SECTIONS

FIG. 4

Devonian

Muddy Peak limestone: lies unconformably on older rocks. At Beaver Dam mountains it consists of 600 feet of thin beds (2'-20'), light to dark gray limestone and dolomite. The equivalent Martin limestone exposed in the Hurricane Cliffs area is 403 feet of gray to light gray limestone and dolomite.

Mississippian

Red Wall and Rogers Spring limestone: 500 feet to 700 feet of well-known Madison limestone. They consist of light and dark, fine-grained, medium-to-thick bedded, cliff-forming, bluish-gray limestones which contain thick zones of abundant chert.

Pennsylvanian

Callville limestone: 1,100 + feet of fine-grained, medium-bedded, gray to pinkish-gray limestone that commonly contains abundant sandstone and is silty and cross-bedded in places. In the Hurricane Cliffs area the Callville limestone and lower Supai sandstone and shales are intertongued.

The Pennsylvanian sediments grade upward into Permian without a distinct lithological change.

Permian

Pakoon limestone: tan to gray dolomitic limestone with scattered bands of chert. The Pakoon limestone wedges out between the Grand Wash Cliffs and the Hurricane Cliffs.

Supai formation: 1,000 + or - feet of red sandstone is coarse to fine-grained and contains massive hard layers of cross-bedded sandstone. Red sandy shale members are at the bottom and top of the formation.

The lower part of the Supai in the Hurricane Cliffs area intertongues and intergrades with the Pennsylvanian Callville limestone. A conglomeratic basal member is also evident in this area. To the west the equivalent of the Supai formation has been designated the Queantoweap sandstone which is a pink and gray, massive, ledge- and cliff-forming sandstone.

Hermit shale: lies unconformably on the Supai formation. It has a thickness of 400 + or - feet and is a deep brick-red sandy shale and fine-grained friable sandstone. Thin, platy laminations are its most prominent structural characteristic. It forms talus slopes in the area.

Coconino sandstone: 50'-200' of yellow and brown mudstone and sandstone exposed in this area are in contrast to exposures of the same formation to the south and southeast. It seems likely that the margin of deposition was in proximity to the area under discussion.

Toroweap formation: Basal member, five to 15 feet, of conspicuous red and yellow mudstone, overlain by a thick-bedded, cliff-forming marine limestone. The Coconino-Toroweap contact is generally conformable, however, in some localities, notably at the head of Hack's Canyon, shallow channels or depressions eroded in the Coconino are filled with yellow mudstone of the basal Toroweap formation.

Kaibab formation: the lower, massive, light-gray marine limestone member overlies the limestone member of the Toroweap formation conformably. The upper member consists of thinner bedded limestone, in part dolomitic, interbedded with mudstone and gypsum. The thickness of this formation varies from 100 to 410 feet.

Triassic

Moenkopi formation: 1,080 to 2,100 feet thick and lies unconformably on the Kaibab limestone. The formation is subdivided into six members: in the upward sequence, the Timpoweap member, the lower red member, the Virgin limestone member, the middle red member, the Shnabkaib member, and the upper red member. The basal Timpoweap member consists of a gray-blue limestone conglomerate and

light-colored sandy shale, all of marine origin. The three red members consist in the main of light red to chocolate brown, thin-bedded, shaly sandstone and mudstone with some gypsum and limestone. All three are continental deposits. The Virgin limestone member, a blue-gray to gray-tan fossiliferous limestone, rests unconformably on the lower red member. The Shnabkaib member is a brightly color-banded, white, pink, light red, gypsiferous sandy shale.

Shinarump conglomerate: 40 to 80 feet thick, locally 200 feet thick, of light-gray to yellow, coarse sandstone and conglomerate that is highly resistant to erosion and forms ledges and dip slopes. It rests unconformably on the Moenkopi formation and many well-defined paleostream channels are evident in the formation in southwestern Utah and northwestern Arizona.

Chinle formation: rests conformably on the Shinarump conglomerate. It is composed of six members (in upward sequence):

Hartley shale - 300 feet of brilliantly variegated, friable shale and shaly sandstone. At the top of this member is a fine- to coarse-grained, white and purple sandstone, five to 20 feet thick.

Fire clay - contains characteristic bentonitic clay. It is similar to the Hartley shale.

Trail Hill - 300 feet of red-brown sandstone and shales with thin silty and sandy limestone beds. This member also contains some fossiliferous white sandstone that is mineralized with copper and uranium in places.

Leeds sandstone - 30 to 60 feet of fine-grained, yellow-brown to buff sandstone which weathers to lighter yellows and white. The Leeds sandstone is interbedded and cross-bedded with lenses of clayey shales and fossiliferous sandy shales. It rests unconformably on the Trail Hill member and is the ore horizon in the Silver Reef area.

Tecumseh sandstone - 70 feet of fine-grained, lavender, red, and gray sandstone with some shale.

Duffin sandstone - 400 feet of light to dark red sandstone with some beds of laminated and conglomeratic limestone.

Quaternary

Basalt flows of varying thickness commonly cap many mesas of different formations throughout the area.

Regional Structure

This airborne reconnaissance program of the Richfield Sub-Office covered an area characteristic of both the Colorado Plateau and the Great Basin and Range provinces. The area may be considered divisible structurally and geomorphically into three units: Colorado Plateau to the east, Basin and Range to the west, and an intervening east-dipping monoclinal block, approximately 25 miles wide, between the Hurricane fault and the Grand Wash fault.

The prominent escarpment of the Grand Wash fault forms a well-defined termination of the Colorado Plateau characteristics.

The Hurricane fault extends from east of Paragonah, Utah, to at least the Colorado River in Arizona, a distance of 170 miles. It has a north-northwest trend in Arizona which changes in the vicinity of the St. George Basin to a north-northeast trend. The fault has dips of 70° west to vertical. The stratigraphic displacement increases from south to north; at the Colorado River it is 1,500 feet, near the state line, 5,000 feet, and a maximum measurable displacement of 10,000 feet at Kanarraville, Utah. North of Kanarraville, the dropped block is concealed by the broad alluvium-filled valleys of the Great Basin.

Geology of the Deposits

The known uranium deposits, Copper Mountain mine, Copper House claims, Chapel claim, and Hack's Canyon mine, of the region flown in

northwestern Arizona (southern Arizona Strip), (see Figure 3), display several common features:

1. Stratigraphic confinement to the Hermit and Supai formations.

2. All are in fractured and brecciated zones.

3. Bleaching and alteration is evident from the surface in all cases.

4. Uranium mineralization is associated with copper in all deposits.

Copper Mountain Mine

The Copper Mountain mine located at the mouth of Andrus Canyon is an old copper producer, discovered before the turn of the century. The mineralization occurs in a complex zone of faulted and brecciated, altered and bleached sandstone (Supai).

Mineralization occurs as fissure fillings in the fault zone and as interstitial emplacement in the bleached and altered sandstone. Minerals found in the upper workings of the mine are of the leached-zone type: azurite, malachite, gold and traces of lead, while in the lower workings the minerals are of the secondary-enriched-zone type: chalcopyrite, bornite, chalcocite. The lower workings 210 feet below the surface have reached what appears to be a perched water table, and here the uranium mineralization, in the form of meta-zeunerite ($CuO\ 2UO_3.AS_2O_5.12H_2O$), is the strongest.

Copper House Claim

The Copper House and adjacent Copper House Coalition claims, approximately one-half mile apart, are also in Andrus Canyon (see Figure 3). These two prospects are located close to two small basic dikes that cut the immediate area. Mineralization occurs in a fractured, bleached and altered zone in the Hermit shale. A gypsiferous

and ferruginous gossan-like capping is evident at the Copper House claim. Copper minerals, malachite and azurite, occur as interstitial fillings in the altered and bleached sandy shale and also along fractures. Iron mineralization at the surface is all secondary. The uranium mineralization appears to be structurally controlled by the fractures. This idea is based on radiometric surveys and assays, since no uranium minerals are megascopically discernible.

Limited diamond drilling of the altered zone has been completed by the lessee and one hole, No. 4, was drilled to a depth of 165 feet and at approximately 115 feet pyrite and chalcocite (?) were present. The total depth of all holes drilled in the altered zone display weak radioactivity.

Assays of Samples Cut

	eU_3O_8	cU_3O_8	V_2O_5	Cu
Copper House	.01	0.011	0.01	1.99
	.18	0.165	0.01	0.07
	.02	0.018	0.01	3.99
Copper House Coalition	.01	0.006	0.02	1.65
	.02	0.029	0.01	4.57
	.06	0.048	0.01	0.60

Hack's Canyon Mine

For a description of the Hack's Canyon mine, the reader is referred to RMOO-24, Report on Investigation of Radioactive Minerals at Hack's Canyon Mine, Mohave County, Arizona, by Charles A. Rasor.

Chapel Claim

The Chapel claim is located in Parashont Wash and was not visited. It is reported that little work has been done on the property.

AIRBORNE PROCEDURES

The vast area examined encompassed many different types of terrain where different problems had to be considered in the execution of the project. Generally, however, in flat terrain ordinary grid flying methods were employed. Prominent topographic and cultural features such as cliffs, drainages, roads, and fences were utilized as end lines. Flight lines were spaced according to the coverage required, about 400 feet apart for 50-percent coverage, and about 1,500 feet apart for ten-percent coverage. One hundred-percent coverage was utilized only in a few places. The Supai and Hermit formations were inspected for favorable geological or structural features, and these favorable features were then covered with 100-percent coverage. Altitudes of flight lines in grid flying were maintained at about 100 feet generally, but in places altitudes as low as 20 feet were necessary.

Along the Hurricane and Grand Wash Cliffs, in the Supai, Coconino, and Red Wall regions and in numerous places where grid methods were not applicable, rim flying methods were used. Flying methods varied according to conditions, but generally distances from the rim varied from about 30 to 100 feet. For 100-percent coverage vertical spacing was about 100 feet and for 50-percent coverage, about 200 to 300 feet.

Two aircraft were used in this project, both Piper PA-18 aircraft, numbers 1162 and 951. Aircraft number 1162 was destroyed in an operational flying accident on April 16, 1954. Three radiation detection devices were utilized. All three were Nuclear Enterprise Mark VI Airborne Type Scintillation Counters, but the sensitivities of the three instruments differed greatly.

RESULTS OF AIRBORNE PROCEDURES

Five surface anomalies, B-8-1, 2, 3, 4, and 5, were detected during the course of this airborne radiometric survey. Anomalies

B-8-1, 2, 3, and 4 are located in northwestern Arizona, Sections 28, 29, 32, 33, Township 28 North, Range 10 West, and are in Lake Mead Recreation Area (see Figure 3). They are of no commercial value. The one anomaly of commercial significance, B-8-5, is in southwestern Utah, Section 29, Township 38 South, Range 12 West (Figure 3), and is within the boundaries of Zion National Monument. Preliminary surface examination of this anomaly disclosed mineralization occurring in a carbonaceous shaly sandstone lens approximately 50 to 60 feet thick at the base of a limestone conglomerate that is probably the Timpoweap member of the Moenkopi formation. The deposit is in a brecciated slumped and altered zone in close proximity to the Hurricane fault.

Assays of Samples Cut

Sample No.	eU_3O_8	cU_3O_8	V_2O_5
F-1134, Chip - 6'	0.20	0.244	0.24
F-1135, Chip - 1'	0.16	0.148	0.38
F-1136, Chip - 1'	0.04	0.004	0.14

ORE RESERVES

Proven ore - 300 tons at 0.24 percent U_3O_8

Possible ore - 300 tons at 0.20 percent U_3O_8

More detailed geological investigation is definitely warranted on this deposit and at present is pending National Park Service clearance.

High background resulting from cloud fall-out from the atomic bomb experiments conducted at Frenchman's Flat, Nevada, during the spring of 1953, prevented airborne reconnaissance of large areas of the Arizona Strip and the St. George Basin. During the course of the program, these high background areas were determined by cross-country flights (see Fig. 3).

The following table includes the data obtained concerning the radiation backgrounds of the various formations to be found in the

region examined. The data tabulated was obtained with a Nuclear Enterprise Mark VI Airborne Type Scintillation Counter, Number 606.

Formation	Areas of normal background	Areas of high background
Red Wall	45-50	
Supai	75-100 (high count probably due to Hermit talus)	
Hermit	100	
Coconino	50-60 (subject to variation from radiation from Hermit shale below)	
Kaibab	50-65	65-100 (plus)
Moenkopi	70-80	75-100 (plus)
Shinarump	50-60	75-100 (plus)
Chinle	75-90	100 (plus)
Navajo	50	65-75 (plus)

All readings were obtained in the period May 14 to May 23, 1954. Abnormally high background readings increase to the west, toward Frenchman's Flat, and decrease gradually to normal near the Paria River, Utah. Almost all of the region south of St. George to the Colorado River has some fall-out material. There is more fall-out south of the Colorado River, but its extent was not determined.

GROUND INVESTIGATIONS

Anomalies B-8-1, 2, 3, and 4 were examined surficially and radiometrically. A Scintillator, Precision Model 111, was used to examine these anomalies.

Assays of Samples Cut

Sample No.	eU_3O_8
28476, B-8-1, Grab	.001
28477, B-8-2, Grab	.004

Anomaly B-8-5 was radiometrically surveyed with a Halross Model 939 Scintillometer and is discussed under "Results of Airborne Procedures".

Ground crew activity was limited greatly by the inaccessibility of the area. The Copper House and Copper House Coalition claims in Andrus Canyon were mapped by plane table methods, geological and topographic maps compiled, radiometric surveys run, using a Halross Model 939 Scintillometer, isorad map prepared, samples cut, and diamond drill holes probed. Assays of samples cut are listed under "Geology of the Deposits".

Favorable stratigraphic, lithological, and structural features and old mines and prospects in the St. George Basin and Beaver Dam mountain area were checked by ground reconnaissance.

RECOMMENDATIONS

1. Airborne reconnaissance of the Hermit and Supai formations may be aided by visual airborne inspection coverage. Uranium mineralization is probably not present in the dark, brick-red, hematitic colored portions of these formations. By visual airborne inspection, altered and bleached zones, faults, fracture systems, slump blocks, and old mining activity in these formations can be detected and subsequently radiometrically reconnoitered. In this manner the two formations could be completely covered and the time-consuming radiometric coverage of the unfavorable portions of the formation could be eliminated.

2. Known uranium mineralization in the area does not manifest radiometric anomalies of three times background. Consequently, minor radiometric highs should be investigated.

3. The ten-percent coverage of the broad flat outcrops could be flown, if possible, by the U. S. Geological Survey's DC-3. Detailed coverage would be left to the smaller aircraft. This arrangement would afford a faster and more saturated coverage of this type of outcrop. Economical feasibility of this recommendation would have to be further investigated, i.e., cost of DC-3 coverage vs. cost of small plane coverage.

4. The 1954-1955 airborne activity in the southwestern Utah-northwestern Arizona region should be preceded by cross-country flights to determine and delineate areas of abnormally high background.

CONCLUSIONS

1. One anomaly of the five discovered contains deposits of commercial value.

2. The possibility of new discoveries by ground reconnaissance within the Arizona Strip area flown is unlikely. Remoteness, inaccessibility, and lack of interest in the area will limit prospecting. Development of the Copper Mountain mine and production therefrom may stimulate new interest in this area.

3. The area flown in northwestern Arizona cannot be classified as a favorable one for uranium production with the exception of the Copper Mountain mine and the Chapel claim.

4. The most favorable area for future airborne reconnaissance appears to be the Hurricane fault. Special attention should also be given the Moenkopi-Kaibab contact.

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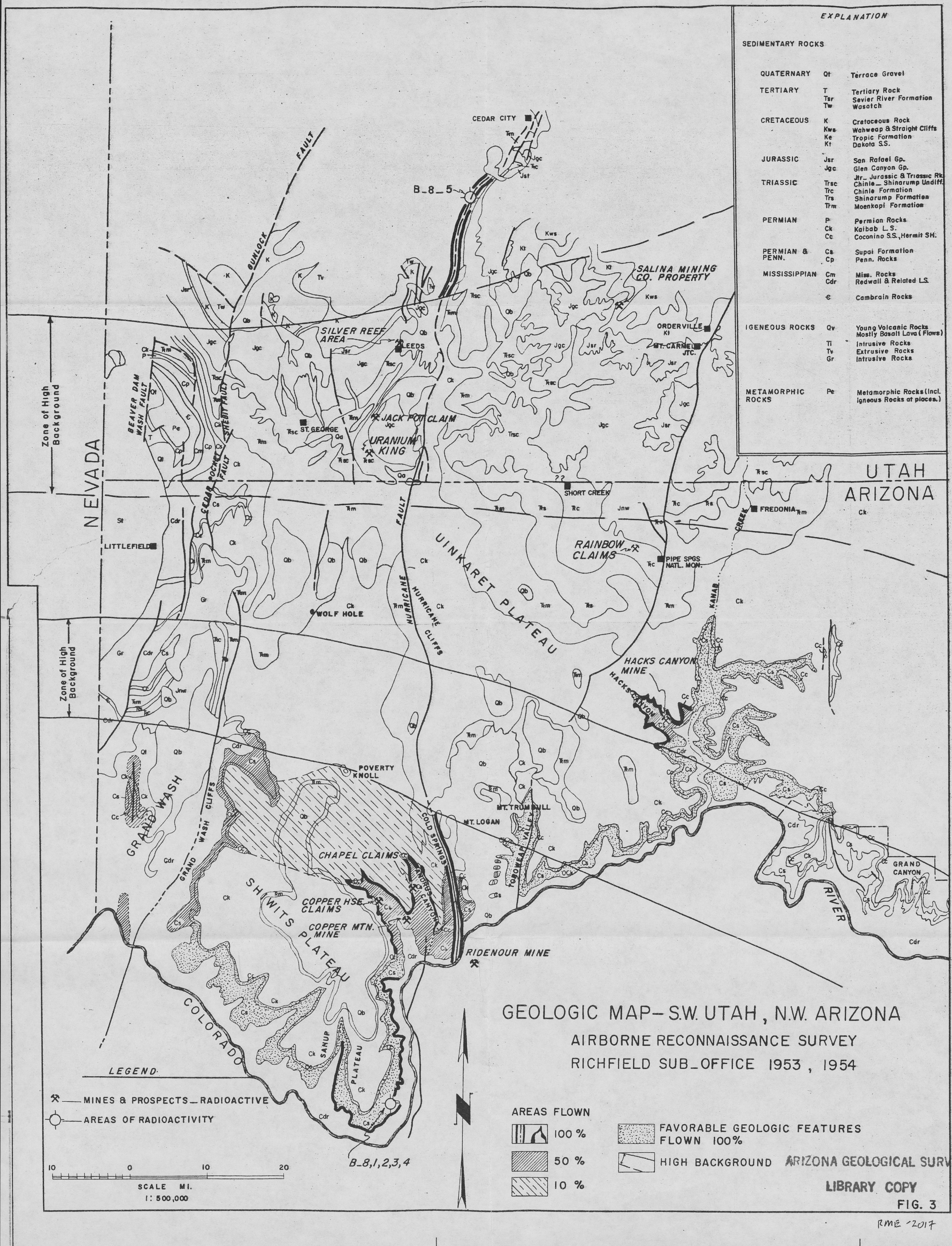

GEOLOGIC MAP—S.W. UTAH, N.W. ARIZONA

AIRBORNE RECONNAISSANCE SURVEY

RICHFIELD SUB_OFFICE 1953, 1954

AREAS FLOWN

100 %

50 %

10 %

FAVORABLE GEOLOGIC FEATURES FLOWN 100%

HIGH BACKGROUND

FIG. 3

RME -2017