

September 26, 1974

UTAH GEOLOGICAL AND MINERAL SURVEY  
U. S. Bureau of Mines Contract HO 232069  
Uranium-Vanadium Report 19

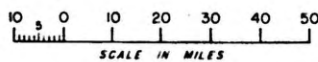
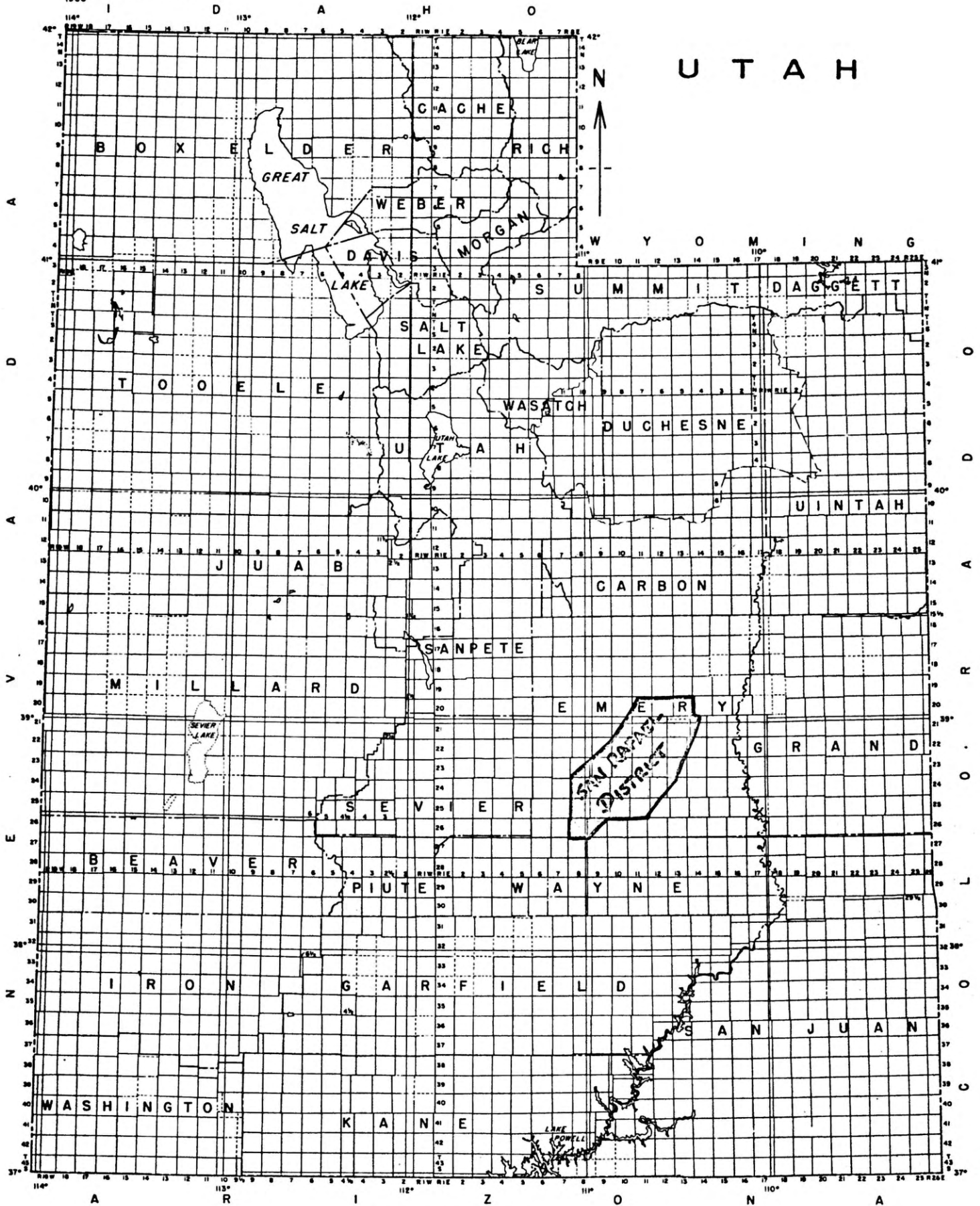
SAN RAFAEL DISTRICT

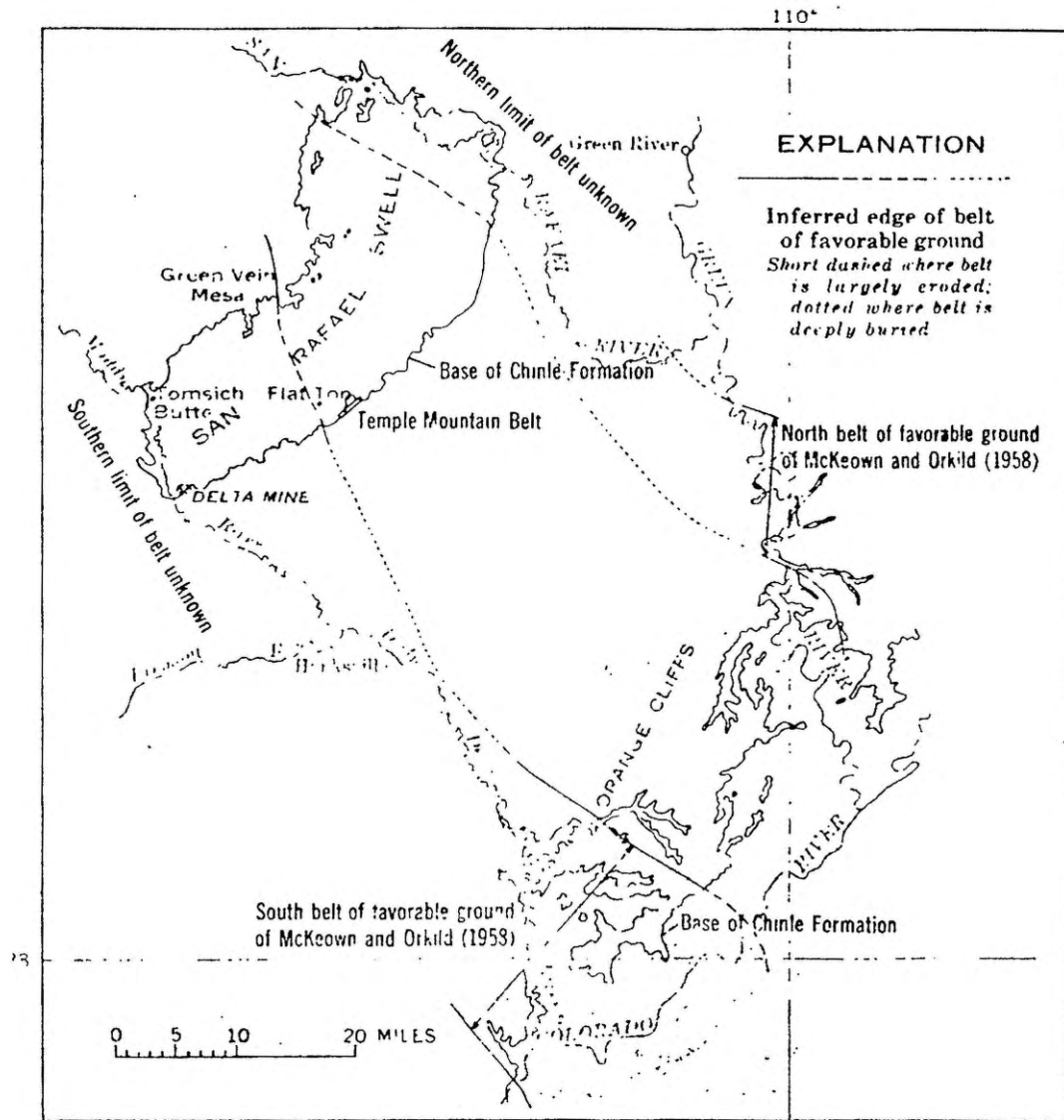
The San Rafael district covers a 1,000 square mile area in south-central Emery County and is superimposed on an uplift with the same name. The structure is a northeasterly trending asymmetrical anticline with a steep southeast flank. There are several areas of better mineralization, one of which, Temple Mountain, is discussed in report 18. Rocks of Permian age are exposed in the core and Jurassic rocks form the outer edges. Triassic rocks are exposed in the intervening areas.

The principal deposits are in the Triassic Chinle Formation, a few in the Jurassic Morrison. Besides uranium, the Chinle contains vanadium, copper, zinc, lead and molybdenum in anomalous irregular amounts. In low grade ore the valuable substances are mostly interstitial to the detrital grains of the host sandstones and conglomerates (basal Chinle Monitor Butte or Moss Back Members) and in high grade ore even the grains are replaced. Outside of Temple Mountain there are two belts of favorable ground, one to the south and the other to the north. The southern belt contains most all of the larger deposits which coincide with well-formed scour fill channels. The deposits occur either in sandstone lenses of the Monitor Butte Member, in scour-channel deposits of the Moss Back cut into the Monitor Butte, or rarely in the underlying Moenkopi Formation. The deposits of the north belt are in the Temple Mountain or Moss Back Members of the Chinle in the basal parts of channels.

The south ore bodies range from a few tons of ore to more than 100,000 tons, but typical bodies are in the 1000 to 5000 ton range. The upper limit to the north may be 1000 tons. The shape of the ore bodies is tabular or in the form of rolls

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Base from Finch (1955)

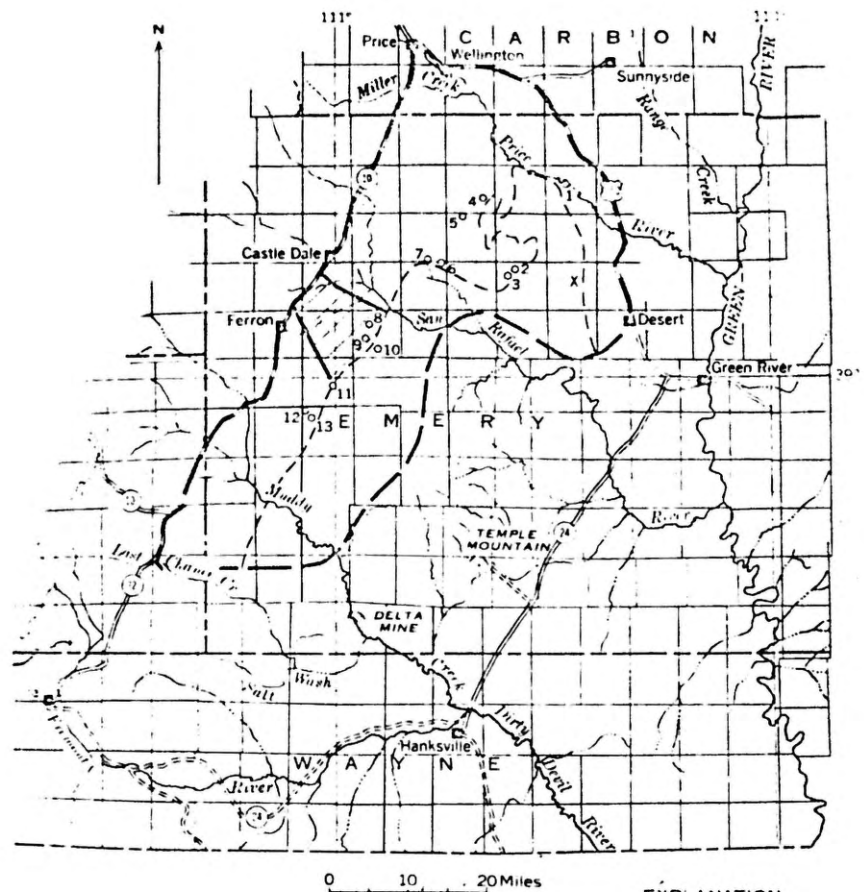
## FAVORABLE GROUND FOR URANIUM EXPLORATION

with a crescent shape. The ore bodies contain principally uraninite or a uraniferous carbonaceous mineralloid, asphaltite, rarely coffinite, pyrite, galena, sphalerite, chalcopyrite and chalcocite. Secondary minerals include carnotite, zippeite, metazeunerite, torbernite and metatorbernite.

The deposits in the Morrison Formation are located mainly to the north of the main part of the San Rafael Swell. The best areas occur where individual sandstone lenses thicken to 30 to 40 feet. Apparently there is a northwest trending lobe of thicker Salt Wash Member. The Salt Wash is generally barren where thicker sandstone lenses cannot be found. Occasionally the Brushy Basin Member is mineralized as well. A gray-green bleaching and carbonaceous trash is usually attendant in the vicinity of ore. Largest ore body discovered to date was less than 1,000 tons.

Eighty one mines, 46 listed with reserve were reported upon. Total production for the San Rafael District minus the Temple Mountain area is estimated at about 300,000 tons. None of the mines are presently operating.

01181*	Apex 5	01247*	Cistern Mine
01182*	Commonwealth	01248*	Conrad
01183*	Consolidated	01249*	Delta-Hidden Splendor
01184	Dolly	01250*	Dirty Devil 1,2
01185	DTC	01251*	Dirty Devil 3,4
01186*	Green Vein Group	01252*	Dirty Devil 6
01187*	Hertz	01253	Eagle-Battleship
01188	Little Joe	01254*	Fremont
01189*	Lucky Seven	01255	Great Basin
01190*	Lucky Strike	01256	Green Dragon 3
01191*	Moroni Hunt	01257	Green Dragon 4
01192*	Nelson 3	01258	Joshua
01193*	Payday	01259*	Little Erma 2
01194*	Sheba	01260*	Little Susan
01195*	Strike	01261*	Little Wild Horse 3
01196*	Sinbad	01262*	Little Wild Horse 6
01197	Thunderbird	01263	Magor
01198	Unknown	01264	Mildred
01199	Unknown	01265*	Paleface
01241	A & G	01266	Rainbow
01242*	Big Chief 1-5	01267	Red Butte
01243	Black Jack	01268*	Rio Colorado
01244	Blue Bird (Green Dragon)	01269*	Ryan 101
01245*	Blue Bird (Hunts Group)	01270	Spanish Trail
01246*	Canary Group	01271*	Standard Ore and Alloys



MINES OR PROSPECTS	ORE BEARING UNIT	EXPLANATION
1 Bull Island group	Brushy Basin member	Outcrop of Salt Wash member of Morrison formation
2 Unknown	Salt Wash member	Relatively favorable ground in Salt Wash member of Morrison formation
3 Unknown	Salt Wash member	
4 Cottonwood No 1	Salt Wash member	
5 Cedaridge	Cedar Mountain formation	
6 South Rim	Brushy Basin member	
7 Cedar Mountain No 1	Brushy Basin member	
8 Ronda Rebecca knolls	Brushy Basin member	
9 White Star group	Salt Wash member	
10 Bell View and Copper Rock	Entrada sandstone	
11 Unknown	Summerville formation	
12 Unknown	Cedar Mountain formation	
13 Unknown	Brushy Basin member	
x Copper prospect in fault zone	Navajo sandstone	
		○ Uranium deposit with less than 100 tons production through June 1955

Map showing ore deposits cropping out and ground relatively favorable for uranium deposits in the Morrison Formation, northern fringes of the San Rafael Swell, Emery County, Utah.

01291	Black Mountain	02206	Cottonwood 1
01292*	Cancer Cure 1	02207*	Dexter 7
01293*	Cancer Cure 10	02208*	Lone Tree
01294	Donna B.	02209	Rock Island Group
01295*	Magobar	02210	South Rim
01296*	Thrust Fault 1-14	02211	White Star Group
01297*	School Section 36	02212	White Star 1-10
01298*	Virginia Low	02213	Copper Head
01299*	Wickiup Group	02214*	Dexter 5
01316*	Black Dragon	02402	Pacific Ventures
01318*	Cliff Dweller		
01322	Fry Claims		
01324*	Hope Claims		
01337	Uneva		
01340	Unknown		
01384	Desolation		
01402*	Virginia Valley		
02201*	Blue Bird		
02202	Buckhorn		
02203	Cedar Mtn. 1		
02204	Cedar Ridge 2		

San Rafael District Reserves

	<u>Probability</u>	<u>Grade %</u>	<u>Tons</u>	<u>Pounds U<sub>3</sub>O<sub>8</sub></u>
90	(Measured)	0.20	50,800	205,330
75	(Better Indicated)	0.14	2,700	7,550
50	(Indicated)	0.56	73,050	245,550
25	(Better Inferred)	0.12	144,850	345,050
10	(Inferred)	0.15	133,550	401,550
	Grand Total	0.22	404,950	1,205,030

	<u>Probability</u>	<u>Grade %</u>	<u>Tons</u>	<u>Pounds V<sub>2</sub>O<sub>5</sub></u>
90	(Measured)	---	---	---
75	(Better Indicated)	---	---	---
50	(Indicated)	---	---	---
25	(Better Inferred)	0.50	58,000	580,000
10	(Inferred)	---	---	---
	Grand Total	0.50	58,000	580,000

San Rafael district mines were cursorily examined by our consultant, other information was obtained from the following literature or sources:

Atomic Energy Commission, records, 1973 and 1974

Emery County courthouse records, 1974

Gott, G. B. and Ericksen, R. L., 1952, Reconnaissance of uranium and copper deposits in parts of New Mexico, Colorado, Utah, Idaho, and Wyoming: U. S. Geol. Survey Circ. 219, p. 5-8.

Hawley, C. C. and others, 1968, Geology, altered rocks and ore deposits of the San Rafael Swell, Emery County, Utah: U. S. Geol. Survey Bull. 1239.

Isachsen, Y. W. and Evensen, C. G., 1956, Geology of the uranium deposits of the Shinarump and Chinle Formations on the Colorado Plateau: U. S. Geol. Survey Prof. Paper 300, p. 263-280.

Johnson, H. S. Jr., 1957, Uranium resources of the San Rafael district, Emery County, Utah -- a regional synthesis: U. S. Geol. Survey Bull. 1046-D.

Johnson, H. S. Jr., 1959, Uranium resources of the Cedar Mountain area, Emery County, Utah -- a regional synthesis: U. S. Geol. Survey Bull. 1087-B.

Reyner, M. L., 1950, Preliminary report on some uranium deposits along the west side of the San Rafael Swell, Emery County, Utah: U. S. Atomic Energy Comm. RMO 673, 31p.

Utah State Tax Commission records, 1973.