DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT
81-734

MINERAL SURVEYS

Wilderness Studies Related to Bureau of Land Management

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976), requires the U.S. Geological Survey and the U.S. Bureau of Mines to conduct mineral surveys on certain areas to determine mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral survey of the Dark Canyon Instant Study Area, San Juan County, Utah.

CORRELATION OF MAP UNITS

Qa			QUATERNARY
TRh	Upper Triassic(?)		TRIASSIC
TRw	Upper Triassic		
TRc	TRcu	Upper Triassic	
	TRcl		
TRm	Middle(?) and Lower Triassic		
Pc	Pco	Lower Permian	PERMIAN
	Pcc		
PPr			
PPh	PPhh		PENNSYLVANIAN
	PPhp	Middle Pennsylvanian	

DESCRIPTION OF MAP UNITS

Qa — ALLUVIUM (QUATERNARY)—Valley fill, talus, dune sand, colluvium

TRk — KAYENTA FORMATION (UPPER TRIASSIC(?))—Sandstone, dark red

TRw — WINGATE SANDSTONE (UPPER TRIASSIC)—Sandstone, in part crossbedded

TRc — CHINLE FORMATION (UPPER TRIASSIC)—TRcu, upper part, shale and sandstone; TRcl, lower part, conglomerate at base may be Shinarump Member equivalent

TRm — MOENKOPI FORMATION (MIDDLE(?) AND LOWER TRIASSIC)—Siltstone, sandstone

Pc — CUTLER FORMATION (LOWER PERMIAN)—Sandstone, siltstone; includes the Pcm, Organ Rock Member, and Pcc, Cedar Mesa Sandstone Member

PPr — RICO FORMATION (LOWER PERMIAN AND PENNSYLVANIAN)—Limestone, shale, siltstone, sandstone

PPh — HONAKER TRAIL FORMATION OF WENGERD AND MATHENY (1958) (PENNSYLVANIAN)—Sandstone, limestone, shale

PPp — PARADOX FORMATION OF WENGERD AND MATHENY (1958) (MIDDLE PENNSYLVANIAN)—Gypsum, limestone, shale, sandstone, dolomite

CONTACT

CONTACT—Showing mapped Shinarump Member

FAULT—Bar and ball on downthrown side; dashed where approximate

STRIKE AND DIP OF BEDS

ANTICLINE—Showing direction of plunge

SYNCLINE—Showing direction of plunge

MONOCLINE—Arrow in direction of steeper dip (anticlinal)

MONOCLINE—Arrow in direction of steeper dip (synclinal)

GEOCHEMICAL SAMPLE SITE—Stream sediment

GEOCHEMICAL SAMPLE SITE—Pan concentrate

GEOCHEMICAL SAMPLE SITE—Rock outcrop

DRILLED WELL (DRY HOLE)

AREA OF MODERATE POTENTIAL FOR URANIUM DEPOSITS

BOUNDARY OF STUDY AREA

INTRODUCTION

During 1978 and 1979 the U.S. Geological Survey and the U.S. Bureau of Mines conducted field investigations to evaluate the mineral-resource potential of the Dark Canyon Instant Study Area, San Juan County, Utah. Field studies included geologic mapping, geochemical sampling, and a survey of known mines, prospects, and mineralized areas. The Dark Canyon Instant Study Area is considered to have a low to moderate potential for resources of uranium and other metal and evaporite minerals. The potential for commercial oil and gas deposits is considered to be low, although sufficient wells have not been drilled to test all possible traps.

GEOLOGY

The Dark Canyon Instant Study Area lies in San Juan County in southeastern Utah. As a part of the Colorado Plateau physiographic province, the area is in the northern portion of the broad anticlinal Monument Upwarp, which extends 75 mi north from the Arizona border and plunges gently northward in and north of Dark Canyon. Several gentle and minor anticlines, synclines, and monoclines have been mapped in the eastern portion of the study area and to the southeast, most trending northeast, north, and northwest and are parts of the upwarp. The upwarp is asymmetrical. It is bounded on the east by the north-trending Comb Monocline, with structural relief of about 2,500 ft. The western margin is structurally indistinct; the regional dip is gently inclined to the west and northwest.

The surface expression of the upwarp is the stripped surface of the Cedar Mesa Sandstone Member of the Cutler Formation of Permian age, with Permian and Triassic rocks forming buttes rising above it and deep canyons (Cataract, Dark, Woodenshoe, and Gypsum Canyons) incised through it into the Pennsylvanian rocks beneath. Older sedimentary units, ranging in age from Cambrian to Pennsylvanian, are not exposed in the study area but have been penetrated by test wells, as has the Precambrian basement. The regional dip carries this surface downward to the west, and the western margin of the upwarp is topographically defined by the cliffed erosional edge of the overlying resistant Triassic sandstones.

The Henry Mountains, an isolated group of mid-Cenozoic laccolithic and stock-like intrusives, lie about 30 mi to the west; the Abajo (Blue) Mountains, a similar but smaller group, lie about 25 mi to the east.

A long narrow graben, formed by less than 100 ft of downdropping of a wedge of sedimentary units, extends east-west south of the Abajo Mountains for 25-30 mi, terminating near the Comb Monocline at the east-central edge of the study area. A smaller group of similar grabens trends southwestward north of the Abajos in an en echelon pattern; each one includes a more southerly bend, then turns westward. The Dark Canyon-Trail Canyon fault system, with minor and variable vertical movement, follows this trend and may represent this group of grabens within the study area. If, however, the grabens are deep, basement-controlled features, the Dark Canyon faults may extend downward through the entire sedimentary sequence into the Precambrian rocks.

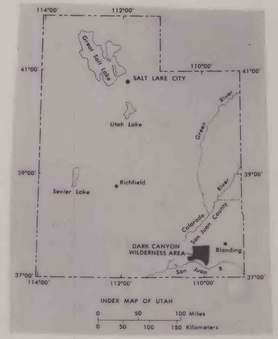
An arcuate swarm of near-vertical faults trending east, then swinging northeast, is the main structural feature of the northern part of the study area and adjacent areas to the north. These faults, with minor displacements indicated by the surface topography, form a series of horsts and grabens cut by cross faults of similar displacement. These faults have been described (Lewis and Campbell, 1965) as joint-controlled features resulting from solution removal of evaporite units (gypsum and salt) of the Paradox Formation, and hence are restricted to units above the Paradox. At least some of the solution postdates the cutting of Cataract Canyon of the Colorado River and continues to the present time—large blocks slumping along arcuate fractures are well displayed in upper Gypsum Canyon.

The Dark Canyon-Trail Canyon fault system resembles the extensive graben features in length, and it resembles the Cataract Canyon features in part in arcuate trend. It is not yet known whether this system is deep-seated, extending into the Precambrian basement, or is restricted to units of Paradox age and younger.

REFERENCES

Lewis, R. Q., Sr., and Campbell, R. H., 1965, Geology and uranium deposits of Elk Ridge and vicinity, San Juan County, Utah: U.S. Geological Survey Professional Paper 474-B, 69 p.

Wengerd, S. A., and Matheny, M. L., 1958, Pennsylvanian system of Four Corners Region: American Association of Petroleum Geologists Bulletin, v. 42, no. 9, p. 2048-2106.



Base from U.S. Geological Survey, 1:62,500, Bears Ears, 1956; Browns Rim, 1952; Fable Valley, 1954; Mouth of Dark Canyon, 1952; Natural Bridges, 1952; Orange Cliffs, 1953; The Needles, 1953

SCALE 1:250 000
0 10 15 20 25 MILES
5 0 5 10 15 20 25 30 35

Geology compiled by J. L. Weitz, 1981

MINERAL-RESOURCE POTENTIAL OF THE DARK CANYON INSTANT STUDY AREA, SAN JUAN COUNTY, UTAH

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