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PRELIMINARY REPORT ON GEOLOGIC STUDIES IN THE CAPITOL REEF AREA, WAYNE COUNTY, UTAH

Trace Elements Memorandum Report 247

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

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Dr. Phillip L. Merritt, Assistant Director
Division of Raw Materials
U. S. Atomic Energy Commission
P. O. Box 30, Ansonia Station
New York 23, New York

Dear Phil:

Transmitted herewith for your information is one copy of Trace Elements Memorandum Report 247, "Preliminary report on geologic studies in the Capitol Reef area, Wayne County, Utah," by J. Fred Smith, Jr., E. Neal Hinrichs, and Robert G. Luedke, November 1951.

This report presents preliminary results of work done in the Capitol Reef area during the 1951 field season. A more complete report is in preparation.

Sincerely yours,

W. E. McKelvey

W. H. Bradley
Chief Geologist

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This document consists of 8 pages,
Series A

CATEGORY VII (Deposits west of the
Rocky Mtns.)

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

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By

J. Fred Smith, Jr., E. Neal Hinrichs, and Robert G. Luedke

November 1951

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Trace Elements Memorandum Report 247

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PRELIMINARY REPORT ON GEOLOGIC STUDIES IN THE CAPITOL REEF AREA, WAYNE COUNTY, UTAH

By

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INTRODUCTION

The Capitol Reef area covers about 450 square miles in Wayne County, South-central Utah. The principal objectives of the geologic mapping and study are: (1) to determine ore guides, controls, and habits; and (2) to determine parts of the area favorable for physical exploration. Sixty square miles has been mapped at a scale of 1:62,500 by plane-table methods (fig. 1), and approximately 35 linear miles of Shinarump conglomerate outcrop has been examined in detail. This work was done on behalf of the Atomic Energy Commission.

GEOLOGY

Formations in the area mapped during 1951 range from the Coconino sandstone of Permian age to the Navajo sandstone of Jurassic age (table 1). The beds are on the east and north flanks of a dome, the east flank of which is part of the Waterpocket fold. On the north, the strata are broken by east-west faults.

Table 1.--Formations exposed in the part of the Capitol Reef area, Wayne County, Utah, that was mapped during the 1951 field season.

System	Formation	Thickness (feet)
Jurassic	Navajo sandstone	400
	Kayenta formation	240
	Wingate sandstone	350
	Unconformity	
Triassic	Chinle formation	475
	Shinarump conglomerate	0-75
	Unconformity	
	Moenkopi formation	890
	Unconformity	
Permian	Kaibab limestone	150
	Coconino sandstone	500

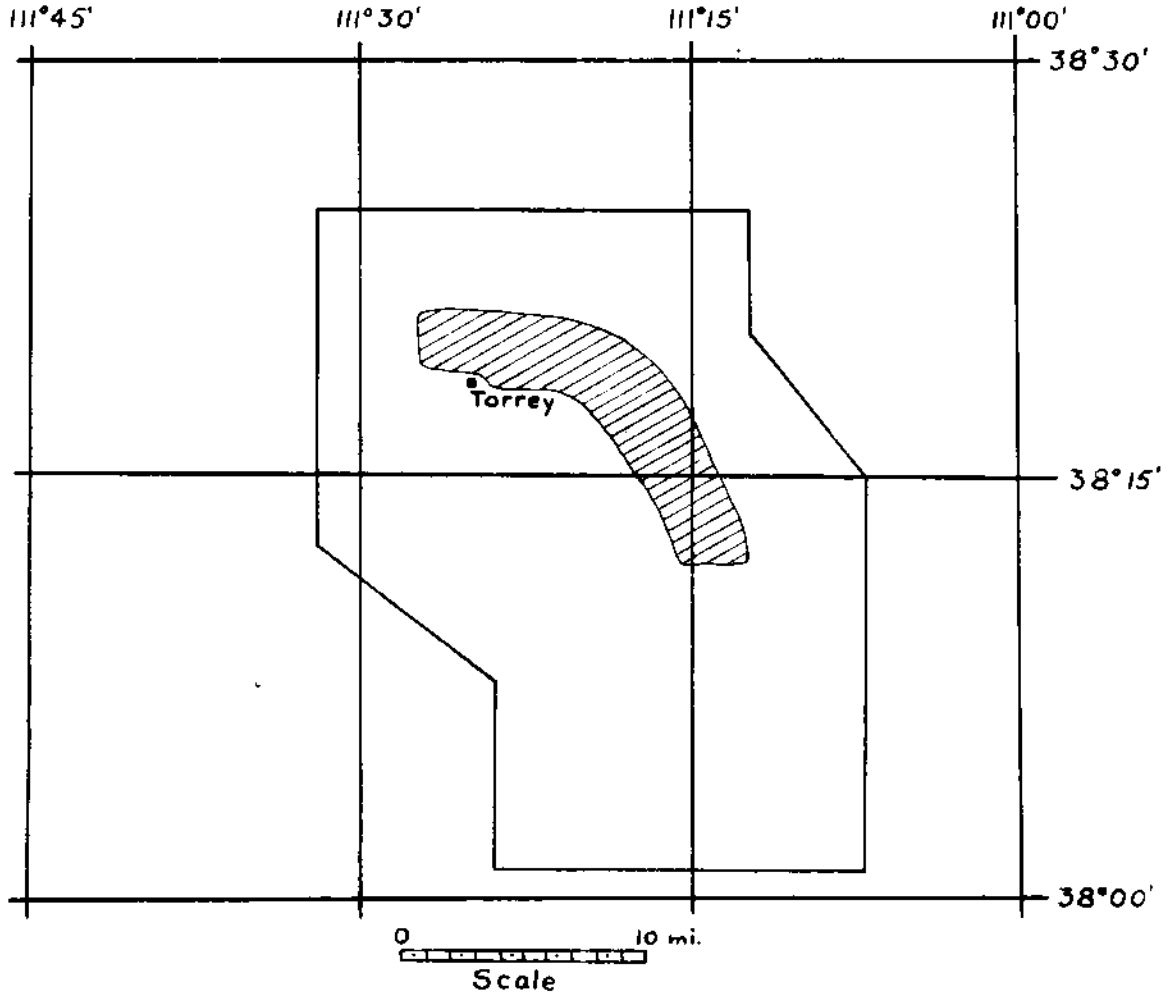


Fig. 1 - Map showing location of Capitol Reef area, Wayne County, Utah.

Area mapped by plane table methods during 1951

ORE DEPOSITS

Ore deposits are of the carnotite type, and copper is associated with the uranium minerals. Radioactive material is in a basal bed of the Shinarump conglomerate. This bed consists mostly of clay with some sandstone and carbonaceous matter; in most places it is a few inches to 1 foot thick, but locally it is about 2 feet thick. From Grand Wash south to Capitol Wash copper-stained rock is abundant in this basal bed and in the upper 1½ feet of the Moenkopi formation; the stain is green and blue, probably copper sulfate. At several localities in the same area, parts of the basal Shinarump are slightly radioactive. Sandstone in the Shinarump above the basal zone generally is not radioactive.

At present, the prospects for any large production are not favorable. The most development has been at the Oyler mine in the Capitol Reef National Monument.

RESULTS OF WORK

Ore guides

Uranium minerals and radioactivity are omitted from the following list of ore guides, because thay are obvious. Any one of the following guides alone is not indicative of uraniferous rock. Naturally, the chance of finding ore increases as more guides are found together.

(1) Filling of channel in underlying strata by Shinarump conglomerate. This is considered a good guide, because the deposit at the Oyler mine and deposits in other areas are in such channels. Channel fills lacking other favorable guides, however, are not necessarily uraniferous.

(2) Concentration of carbonaceous matter. Carbonaceous matter apparently is important in the localization of uraniferous deposits.

(3) Copper minerals. Secondary copper minerals are abundant in parts of the basal Shinarump conglomerate and the upper 1½ feet of the underlying Moenkopi formation. Copper-stained rock is associated with all radioactive deposits examined thus far, but many places with copper staining are not radioactive.

(4) Thick zone of bleached "clay" below the Shinarump conglomerate. Below the Shinarump the red-brown Moenkopi beds have been bleached to light greenish gray. This bleached zone is generally 6 to 12 inches thick, but it is considerably thicker below mineralized parts of the Moenkopi; at the Oyler mine it is as much as 6 feet thick. Copper staining is common in the bleached Moenkopi.

(5) Thickness of layer of clay and some sandstone in base of Shinarump. A layer of clay with some sandstone underlies sandstone of the Shinarump over most of the area. Commonly it contains much carbonaceous matter, and it contains almost all the radioactive material. The presence of this zone alone is not a guide to ore, but if this zone is less than about 6 inches thick, little radioactive material is found in association with the other guides.

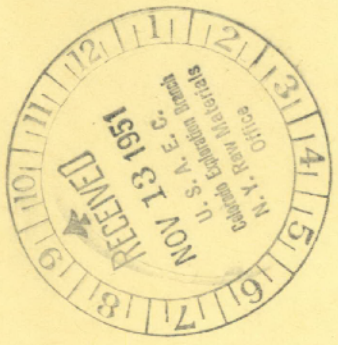
FAVORABLE AREAS

No areas along Capitol Reef are considered very favorable for physical exploration. The most favorable area is along the zone of Shinarump outcrops from the Oyler mine in Grand Wash southeast along Capitol Reef almost

to Capitol Wash, a distance of about 4 miles. Several places in the clay zone at the base of the Shinarump are slightly radioactive, and copper-stained rock is abundant in the clay zone and in the bleached upper 1½ feet of the Moenkopi formation. The Cyler mine is in a channel, and a small isolated hill, just south of the mine, is along a possible extension of this channel. In addition, three other channels with scour of 2 to 4 feet were found farther south. Small scours in the top of the Moenkopi formation are common in this area. Channels and scours trend between about N. 5° E. and N. 40° E. Radioactive material is concentrated in the basal clay zone of the Shinarump where carbonaceous matter is abundant and at one locality where a jasper layer contains specks of what are apparently hydrocarbons.

PLANS

Present plans call for continuation of field work in the Capitol Reef area during the 1952 field season. During the winter of 1951-1952 and 1952-1953 project work will consist of map compilation, library investigations, sedimentary petrology and other laboratory work, and report writing. Most of the field work should be completed by the end of the 1952 field season.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