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DEPARTMENT OF THE INTERIOR

RECONNAISSANCE EXAMINATION OF THE URANIUM DEPOSITS NORTHEAST OF WINSTON, BROADWATER COUNTY, MONTANA

By
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This report is preliminary and has not been edited or reviewed for conformity with U. S. Geological Survey standards and nomenclature.

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UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

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Trace Elements Memorandum Report 917

*This report concerns work done on behalf of the Division of Raw Materials of the U. S. Atomic Energy Commission.

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ABSTRACT

Anomalous radioactivity and a yellow secondary uranium mineral tentatively identified as carnotite have been found in Tertiary sedimentary rocks about 3 miles northeast of Winston, Mont. The uranium is in tuffs and tuffaceous shales and particularly in beds rich in organic matter. Carnotite(?) was identified from three localities, principally coating fractures but in places partly replacing organic material, and anomalous radioactivity without recognizable uranium minerals has been detected at four localities. Six of the seven localities are at approximately the same stratigraphic horizon. The deposits are virtually unexplored and consequently their size and grade are not known. Selected specimens assay as high as 0.36 percent eU.

Exploitable deposits of uranium may be found in this area, as well as in similar areas of western Montana that are underlain by Tertiary tuffaceous rocks.

INTRODUCTION

The areas and deposits described in this memorandum are in sections 18, 20, and 28, T. 9 N., R. 1 E. in the Canyon Ferry quadrangle about 3 miles northeast of Winston, Mont. Relief in

the vicinity of the deposits is about 200 feet. A graded road along Beaver Creek crosses the northern part of section 28 and an old unimproved dirt road crosses section 18.

The geology of the Canyon Ferry quadrangle was mapped by Mertie, Fischer, and Hobbs (1951). Uranium minerals were discovered in February or March 1955 by local prospectors, and an examination of most of the known uranium occurrences was made by the author on March 21, 1955 accompanied by Arthur W. Hogan and Cecil N. Johansen of Winston, Mont. This examination was made in conjunction with the study of uranium deposits in the Boulder batholith. It is being carried out by the U. S. Geological Survey on behalf of the Division of Raw Materials of the U. S. Atomic Energy Commission.

GEOLOGY

The area is underlain by dissected, gently deformed, east-dipping Tertiary tuffaceous rocks of Oligocene age (Mertie, Fischer, and Hobbs, 1951). The uranium occurrences examined by the writer and described below are in weakly consolidated tuffaceous rocks in the lower third of a bentonite-bearing Tertiary unit (Unit 2 of Mertie, Fischer, and Hobbs, 1951). Most of the uraniferous rocks have a high content of organic matter.

URANIUM DEPOSITS

Seven localities were examined briefly. A more thorough examination was prevented by winter weather.

Locality A

Locality A (fig. 1) is in a shallow bulldozer cut in light gray tuff in sec. 20, T. 9 N., R. 1 E. Radioactivity is confined to an area of several square feet of light brown, relatively well-indurated tuff containing a large amount of organic material exposed near the bottom of the south wall of the bulldozer cut. No uranium minerals were detected. A selected sample assayed 0.20 percent eU.

Locality B

Locality B (fig. 1) is in a bulldozed area at the top of a small bluff in section 20. The uranium is in a 2 foot bed of light reddish-brown tuff underlain by a six inch, light greenish-gray chert bed. Overlying the reddish-brown tuff and underlying the chert is light gray to white tuff. A yellow secondary uranium mineral coats fractures and partly replaces organic material in the reddish-brown tuff. The yellow mineral contains vanadium and is probably carnotite or tyuyamunite. The uranium-bearing bed trends N. 7° W., dips 23° N.E., and is exposed for a strike length of about 200 feet. A selected sample assayed 0.34 percent eU and a bulk sample from a small pile in the bulldozer cut assayed 0.062 percent eU. The bulk sample was ground and separated into size fractions in the Spokane office of the Geological Survey. Each fraction was then assayed for equivalent uranium with the following results:

+ 20 mesh	0.028 eU
+ 40 mesh	0.032 eU
+ 60 mesh	0.044 eU
+ 80 mesh	0.072 eU
+ 100 mesh	0.064 eU
+ 140 mesh	0.074 eU
− 140 mesh	0.11 eU

By weight, one half of the sample is finer than 60 mesh. These data indicate that the bulk of the uranium is concentrated in the finer fractions and suggest that the ore could be concentrated by grinding and screening.

Locality C

Locality C (fig 1) is on a low, rounded nose near the bottom of a rather broad valley in sec. 18, T. 9 N., R. 1 E. The radioactive material is in a dark brown, carbonaceous, tuffaceous shale. Radioactivity can be traced for more than 100 feet along the strike of a bed that does not crop out but is probably about 2 feet thick. The radioactive bed is underlain by a light brown, soft, clayey tuff. Grab samples from two points along the strike of this bed assayed 0.23 and 0.24 percent eU. One sample was ground and separated into fractions based on size of the particles similar to the sample taken from Locality B. There was no concentration of uranium in any size fraction.

Locality D

Locality D (fig. 1) is on a small rounded bare knob in a rather broad valley in section 18. The radioactive material is in a greenish-brown, soft, clayey tuff bed about 4 feet thick. The bed is exposed for less than 100 feet and has an attitude of N. 20° W., 25° N.E. A grab sample of this material assayed 0.069 percent eU.

Locality E

Locality E (fig. 1) is a small outcrop about 500 feet northwest of Locality D and about 50 feet lower in elevation. The rock is a dark brown, carbonaceous, tuffaceous shale similar to that at Locality C. A few fractures are coated with a secondary uranium mineral, probably carnotite. A grab sample assayed 0.034 percent eU.

Locality F

Locality F (fig. 1) is at the top of a cliff in a sandy tuff in sec. 20, T. 9 N., R. 1 E. The radioactivity is relatively weak and is restricted to an iron-stained area with irregular boundaries. The radioactive material at this location is probably not stratigraphically controlled. No samples were collected from this locality.

Locality G

Locality G (fig. 1) is a large area south of Beaver Creek in sec. 28, T. 9 N., R. 1 E. The radioactive material is in thin beds, generally about 1 inch thick, of highly carbonaceous rock in light gray tuff. At least 5 radioactive beds separated by 10 to 50 feet of non-radioactive tuff were observed. The beds strike N. 40° W. and dip 35° N.E. Samples selected from two of the beds assayed 0.054 and 0.36 percent eU.

CONCLUSIONS

In the writer's opinion there is an excellent possibility of finding exploitable deposits of uranium in the area described in this memorandum, and perhaps more important is the possibility that similar uranium deposits may occur elsewhere in the extensive Tertiary tuffaceous deposits in some of the major valleys of western Montana.

LITERATURE CITED

Mertie, John B., Jr., Fischer, Richard P., and Hobbs, S. Warren, 1951, Geology of the Canyon Ferry quadrangle, Montana: U. S. Geol. Survey Bull. 972.

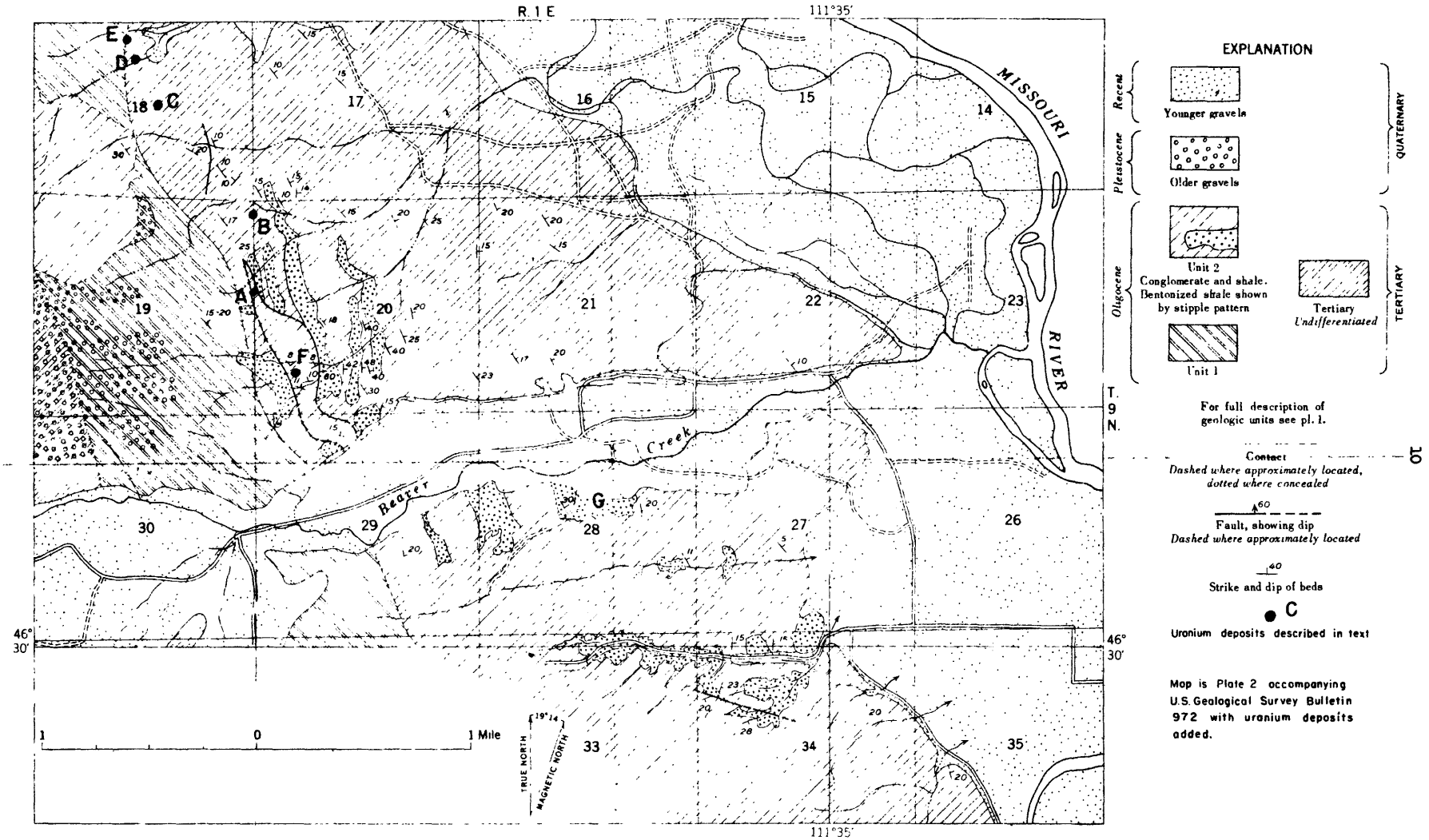

Fig.1 GEOLOGIC MAP SHOWING URANIUM DEPOSITS NORTHEAST OF WINSTON BROADWATER COUNTY MONTANA

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