

PRELIMINARY REPORT ON A
URANIUM-BEARING RHYOLITIC
TUFF DEPOSIT NEAR COALDALE,
ESMERALDA COUNTY, NEVADA

Trace Elements Memorandum Report 336

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

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DEPARTMENT OF THE INTERIOR
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MAR 6 - 1952

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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 are 6 copies of Trace Elements Memorandum Report 336, "Preliminary report on a uranium-bearing rhyolitic tuff deposit near Coaldale, Esmeralda County, Nevada," by D. C. Duncan, February 1952.

This deposit is too small to be important as a commercial source of uranium, but it suggests that other deposits of this type might be in the region. Plans for further work pend the results of sample examinations, which will be included in a final report on the field season's investigations of this deposit.

This report is not for publication. We intend to send the master copy to the Technical Information Service for distribution according to the Standard Unclassified Distribution List, Geology-Mineralogy. We believe that such distribution will not necessitate obtaining the permission of the property owner, as suggested in Mr. J. C. Johnson's letter of February 18, 1952, to Mr. V. E. McKelvey.

Sincerely yours,

V. E. McKelvey

W. H. Bradley

W. H. Bradley
Chief Geologist

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Geology - Mineralogy

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Series A

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY REPORT ON A URANIUM-BEARING RHYOLITIC TUFF DEPOSIT

NEAR COALDALE, ESMERALDA COUNTY, NEVADA *

By

D. C. Duncan

February 1952

Trace Elements Memorandum Report 336

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

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PRELIMINARY REPORT ON A URANIUM-BEARING RHYOLITIC TUFF
DEPOSIT NEAR COALDALE, ESMERALDA COUNTY, NEVADA

By D. C. Duncan

ABSTRACT

A small deposit of uranium-bearing rhyolitic tuff is exposed at the northern end of the Silver Peak Mountains about 4 miles south of Coaldale in Esmeralda County, Nev. The deposit contains a roughly estimated 50 tons of indicated and inferred ore averaging about 0.25 percent uranium; about 350 tons of indicated and inferred ore averaging about 0.025 percent uranium, and perhaps 67,000 tons of indicated and inferred low-grade uranium-bearing rock averaging about 0.005 percent uranium. This deposit is too small to be an important source of uranium but it is of interest as a new locality, at which a small amount of commercial-grade uranium ore is found, in a region that might contain similar deposits.

INTRODUCTION

In the course of examining lignitic shale deposits about 4 miles south of Coaldale a deposit of uranium-bearing rhyolitic tuff was found and examined in reconnaissance in mid-October 1951 by N. M. Denson and D. C. Duncan. The deposit was found by using a portable gamma scintillometer to trace slightly radioactive gravels up dry washes to the bedrock source of the gravel. The locations given in this report were made by compass intersection and use of geologic maps of the nearby lignite field as base. Ten chip samples of representative parts of the deposit were submitted for analysis to the Geological Survey Trace Elements Section Denver Laboratory and several specimens for mineral and rock determination

were collected. These are currently being examined in the Trace Elements Section Washington Laboratory.

The uraniferous tuff deposit, which is accessible by 3 miles of dirt road leading south from the junction of U. S. Highways 6 and 95, is near the south line of the NE $\frac{1}{4}$ sec. 33, T. 2 N., R. 37 E. Mt. Diablo meridian, mostly or entirely on land held privately by coal patent No. 375056 originally issued to Herman Darmes. The reported owner in 1944 was H. A. Darmes but the ownership of the property in 1951 was not checked, nor was an accurate land survey made to determine the position of property lines with respect to the deposit. No evidence of previous prospecting or development of the uranium deposit was observed during the investigation.

Previous work

The general geology of the Silver Peak quadrangle has been mapped and described by Spurr (1906). The Tertiary sedimentary rocks of the region were described by Turner (1899), and lignitic shale deposits in the Tertiary sediments which crop out north of the uranium deposit have been described by Hance (1913), Toenges, et al. (1946), and in an unpublished Geological Survey manuscript report by V. H. Johnson and R. C. Robeck. These earlier reports were directed along other lines of geologic investigation and include a wealth of data useful in interpreting the geology of the area but include no direct information on the uranium deposit.

Geology

The uranium deposit is in a welded tuff of rhyolitic composition. To the west, the deposit of tuff appears to interfinger with a flat-lying red-weathering rhyolitic volcanic sequence composed presumably of both flows and tuffs. The rocks of this volcanic sequence make up the more prominent

landforms of the northern part of the Silver Peak Mountains. North of the deposit tilted sedimentary rocks of the Esmeralda formation (Miocene) are exposed in low foothills. East of the deposit recent alluvium covers extensive pediment flats concealing bedrock. A fault zone trends northwest and forms the contact between volcanic rocks and sediments in a belt about 2 miles long immediately northwest of the uranium-bearing tuff deposit. From the more recent mapping it is believed that the sediments overlies the volcanic sequence and are dropped down against the volcanics along the fault zone in some areas but the presence of a fault adjacent to the uranium deposit was not confirmed in the present investigation. Close jointing in the deposit suggests, however, that some minor displacement occurs in the tuffs perhaps a few feet or a few tens of feet northeast of the deposit.

ORE DEPOSIT

The deposit of uraniferous welded rhyolitic tuff is elliptical in shape and is about 400 feet in length in a northwest-trending direction, parallel to the fault zone, and as much as 200 feet wide. The deposit forms a knoll rising about 70 feet above the adjacent pediment surface. The uranium-bearing tuff is closely jointed and some joints and fractures contain veinlets a few inches to a few feet long, consisting of light- to dark-gray fine-grained siliceous material. Many other joint surfaces are stained brown with iron oxide coatings.

Radioactivity across the surface of the deposit ranged from 5 on the 0.2 scale to 10 on the 20 scale of a Model 2610-A Nuclear counter. The white, rhyolitic welded tuff, which comprises the longest part of the deposit, gave readings ranging from 5 to 10 on the 0.2 scale of the counter. The brown stained joint surfaces, siliceous veinlets, and small masses of tuff, in which some feldspar crystal cavities contain a yellow uranium-bearing

mineral, gave readings of 15 on the 0.2 scale up to 10 on the 20 scale of the Nuclear counter.

Selected chip samples of the rhyolitic tuff taken at 4 places, away from visible joint or vein surfaces, and considered representative of large parts of the deposit, are as follows:

<u>Field No.</u>	<u>Kind of sample</u>	<u>eU/ (percent)</u>	<u>U (percent)</u>
DN-31b	White rhyolitic tuff, chip sample from several faces near southwest margin of deposit	0.008	0.002
DN-32	White rhyolitic tuff, chip sample from several faces near central part of deposit	0.029	0.026
DN-33	White rhyolitic tuff, chip sample from central part of deposit	0.013	0.008
DN-34	White rhyolitic tuff, chip sample from several faces along northeast margin of deposit	0.009	0.003

/ Equivalent uranium

The following samples of the siliceous vein material, yellow-flecked rhyolite adjacent to joints, and rock adjacent to brown-stained joint surfaces yielded the following analyses:

<u>Field No.</u>	<u>Kind of sample</u>	<u>eU (percent)</u>	<u>U (percent)</u>
DN-30	Tuff adjacent to brown-stained joint zone 2" wide	0.046	0.044
DN-31	Dark-gray siliceous veinlet (2" wide)	0.041	0.039
DN-31a	Tuff flecked with yellow mineral filling feldspar crystal cavities	0.14	0.12
DN-32a	Tuff adjacent to joint surface, stained with yellow mineral and flecked with yellow mineral filling some crystal cavities (zone 10" wide)	1.6	1.86
DN-33a	Dark-gray siliceous veinlet and adjacent rhyolite (2" wide)	0.24	0.26

<u>Field No.</u>	<u>Kind of sample</u>	<u>eU (percent)</u>	<u>U (percent)</u>
DN-42	Gray siliceous vein fill in breccia "pipe" about 10 ft. diameter	0.031	0.024

These higher-grade samples represent only a small amount of material distributed at intervals through the deposit.

The uranium-bearing minerals, currently being studied, have not been identified with certainty. The only conspicuous uranium mineral is a yellow powdery material and a yellow crystalline material, the latter of which is reported orally by M. Deul of the Geological Survey to be possibly a mixture of uranophane and phosphuranylite, or possibly an undescribed mineral. No uranium mineral has been identified from the gray siliceous vein material or in the brown coatings of joint surfaces.

ORIGIN

Although the present laboratory study of rock specimens is incomplete, the general field relationships and mineral identifications available indicate that the uranium was concentrated along siliceous veinlets and joints by low-temperature hydrothermal solutions, presumably along joints and fractures developed during faulting. The yellow uranium minerals are possibly alteration products from surface weathering.

RESERVES

The deposit was examined in reconnaissance and the samples obtained are all from weathered surfaces. Consequently, firm reserve estimates must await more complete exploration. Assuming that the deposit extends to an average depth of about 50 feet below surface, indicated and inferred reserves total about 67,000 tons of rock, averaging about 0.005 percent uranium and containing about 3.3 tons of uranium. Indicated and inferred

reserves of rock containing from 0.01 to 0.1 percent uranium and averaging about 0.025 percent uranium are tentatively estimated to aggregate 350 tons of rock containing about 0.8 ton of uranium. Indicated and inferred reserves of commercial-grade ore containing from 0.1 to 1.86 percent uranium and possibly averaging 0.25 percent uranium, are small, aggregating perhaps only 50 tons of rock containing perhaps 0.1 ton of uranium. The downward extent of the deposit is conjectural from present information. If the deposit extends to depths greater than the arbitrarily assumed average of 50 feet, there is a larger tonnage of uranium-bearing rock in the deposit.

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