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INTERIM REPORT ON EXPLORATION
IN THE LA SAL CREEK AREA,
PARADOX DISTRICT, MONTROSE COUNTY,
COLORADO, AND SAN JUAN COUNTY, UTAH

By W. D. Carter, J. L. Gualtieri, and J. C. Warman

Trace Elements Memorandum Report 716

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



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February 4, 1955

Mr. Robert D. Nininger, Acting Assistant Director
Division of Raw Materials
U. S. Atomic Energy Commission
Washington 25, D. C.

Dear Bob:

Transmitted herewith are two copies of TEM-716, "Interim report on exploration in the La Sal Creek area, Paradox district, Montrose County, Colorado, and San Juan County, Utah," by W. D. Carter, J. L. Gualtieri, and J. C. Warman, December 1954.

Sincerely yours,

John H. Eric
for W. H. Bradley
Chief Geologist

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Geology and Mineralogy

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Series A

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

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AND SAN JUAN COUNTY, UTAH*

By

W. D. Carter, J. L. Gualtieri,
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*This report concerns work done on behalf
of the Division of Raw Materials of the
U. S. Atomic Energy Commission.

USGS - TEM-716

GEOLOGY AND MINERALOGY

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ILLUSTRATION

- Figure 1. Map of the La Sal Creek area, Paradox district, Montrose
County, Colorado, and San Juan County, Utah. . . . In envelope

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ABSTRACT

The La Sal Creek area is in parts of T. 28 S., R. 25 and 26 E., T. 29 S., R. 26 E., Salt Lake principal meridian, San Juan County, Utah, and T. 47 N., R. 19 and 20 W., New Mexico principal meridian, Montrose County, Colo. Between May 5, 1952, and November 22, 1954, the U. S. Geological Survey diamond-drilled 505 holes totaling 123,371 feet in the La Sal Creek area. This drilling was done to find extensions of deposits near mine faces, to find deposits that might be developed into new mines, to explore new areas searching for favorable conditions that might lead to the discovery of new deposits, and finally to appraise the uranium reserves in the area. In conjunction with this exploration a program consisting of mine mapping, resource appraisal, and areal geologic mapping began on August 26, 1953, in the La Sal Creek area and adjacent areas which comprise the Paradox mining district.

Indicated and inferred reserves found as a result of the Geological Survey drilling total 115,240 short tons averaging 0.27 percent U_3O_8 and 2.08 percent V_2O_5 . Reserve depletion resulting from mining activity concurrent with the exploration drilling has reduced these reserves to 103,270 short tons of indicated and inferred reserves averaging 0.26 percent U_3O_8 and 2.11 percent V_2O_5 . The reserves are in bodies that contain from 200 to 20,000 short tons.

No additional drilling is planned for the La Sal Creek area during calendar year 1955. Areal geologic and mine mapping is planned during 1955 for geologic information, to appraise the reserves of the area, and to search for new areas in which exploration-type drilling might be done.

INTRODUCTION

The La Sal Creek area includes parts of T. 28 S., R. 25 and 26 E., T. 29 S., R. 26 E., Salt Lake meridian, San Juan County, Utah; and T. 47 N., R. 19 and 20 N., New Mexico principal meridian, Montrose County, Colo. (fig. 1). This area includes about 400 mining claims and some public land.

Total known production of uranium-vanadium ore from the mines in the La Sal Creek area through October 1954 is about 42,410 short tons. Of this amount 18,260 short tons, averaging 1.94 percent V_2O_5 , were produced between 1940 and 1944 (Livingston, 1945). The uranium content was not recorded. The records for the 1944-48 period are incomplete, but only a few tons of ore were produced. A total of 12,180 short tons of ore, averaging 0.30 percent U_3O_8 and 1.92 percent V_2O_5 , was produced between 1948 and October 1953. From that time through October 1954, 11,970 short tons of ore averaging 0.31 percent U_3O_8 and 1.83 percent V_2O_5 have been produced.

Since 1950, about 100,000 feet of diamond drilling and wagon drilling has been done by private industry in the La Sal Creek area.

During the period from May 5, 1952, to November 22, 1954, the U. S. Geological Survey drilled 505 holes totaling 123,371 feet in the La Sal Creek area; (1) to find extensions of deposits near mine faces, (2) to find

deposits that might be developed into new mines, and (3) to appraise the uranium reserves in the area. This report summarizes the results of this exploration and outlines the general plan for additional exploration, all of which is being done on behalf of the Division of Raw Materials of the U. S. Atomic Energy Commission.

GEOLOGY

Sedimentary rocks of Jurassic and Cretaceous age are exposed in the La Sal Creek area. From base to top these rocks consist of the following formations: the Jurassic Navajo, Carmel, Entrada, Summerville and Morrison; and the Cretaceous Burro Canyon and Dakota. These formations constitute a part of the southwest flank of the Paradox anticline and the southeast flank of the La Sal Mountains. The beds dip southwestward from the Paradox anticline and northeastward from the Pine Ridge anticline, which trends northwestward through Wray Mesa, and is believed to be an extension of the Gypsum Valley anticline. These structures are separated by the shallow La Sal Creek syncline whose axis plunges gently southeast from La Sal Pass in the La Sal Mountains, Utah. La Sal Creek roughly parallels the axis of the La Sal Creek syncline.

This report is principally concerned with the Morrison formation as it contains all of the known uranium deposits in the area. The older Jurassic rocks, therefore, are not described here but will be discussed in detail in a subsequent geologic report on the La Sal Creek area.

The Morrison formation is divided into two members. The lowermost the Salt Wash, is about 350 feet thick and consists of broadly lenticular sandstone strata interbedded with red and green mudstone. The Brushy Basin

member overlying the Salt Wash member ranges in thickness from 325 to 400 feet and consists of variegated red and green shales and clays with interbedded conglomeratic sandstone lenses. These members are undifferentiated on figure 1. Erosional remnants of the overlying Cretaceous Burro Canyon and Dakota formation (undifferentiated on fig. 1) surround and are included in the explored area.

Most of the principal uranium-vanadium deposits are in the upper, most-continuous sandstone strata of the Salt Wash member which are referred to on figure 1 as the "ore-bearing sandstone."

Data from drilling in the La Sal Creek area indicate that a favorable area containing most of the mineralized material lies in a northeast-trending belt approximately 6 miles long and 1,000-3,000 feet wide. Within the favorable area the "ore-bearing sandstone" consists of lenticular sandstone strata that amass a total thickness of 30 feet or more with gray-green mudstone either above or below and within the sandstone as seams, pellets, or films. Carbonaceous material is usually present. These criteria and the ~~medium-~~ to fine-grain size, lenticularity of the strata, cross-bedding, current lineation, and presence of green mudstone-pebble conglomerates suggest that the belt is a result of repeated scouring and filling by successively younger, braided meandering streams. Bordering the favorable belt is an intermediate area, classed as semifavorable, which grades laterally into unfavorable ground. Unfavorable areas, believed to be typical of flood plain deposition, are exemplified by thin layers of very fine-grained sandstone, if present, abundant red mudstone, and occasionally thin layers of fresh-water limestone or marl.

Several small deposits occur in a thin, lenticular sandstone stratum just above the "ore-bearing sandstone" and a few are in the lowermost conglomeratic sandstone lenses of the Brushy Basin member.

Drilling on the bench bordering the north and east sides of Wray Mesa was done to obtain geologic information in a large area with a minimum amount of footage. With the exception of deposits in the Yellow Bird group, the deposits found in the remainder of this area are small and scattered. However, the drilling done here is not considered to be conclusive with regard to the delineation of favorable areas nor individual ore deposits.

GEOLOGICAL SURVEY EXPLORATION

From May 5, 1952, to November 22, 1954, the Geological Survey diamond-drilled 505 holes totaling 123,371 feet in the La Sal Creek area. This drilling was done under three separate drilling contracts: (1) May 5, 1952, to September 12, 1952 (Brasher and Douglas, 1952; Douglas and Brasher, 1952); (2) April 23, 1953, to December 9, 1953 (Carter, Gualtieri, and Hedlund, 1954, Carter, 1953), and (3) April 5, 1954, to November 22, 1954 (Carter, 1954; Hedlund, 1954). Under the first contract 173 holes totaling 21,096 feet were drilled; under the second contract 162 holes totaling 42,146 feet were drilled; and under the third contract 170 holes totaling 60,129 feet were drilled.

About 35 percent of the total footage was drilled in widely spaced holes, 500 to 2,000 feet apart, to obtain geologic information; about 25 percent was drilled in moderately spaced holes, 200 to 500 feet apart,

to search for and roughly outline new deposits; and 40 percent was drilled in closely spaced holes, 50 to 200 feet apart, to outline more completely the known deposits. About 30,350 feet, or 24 percent of the total footage was expended in closely spaced holes considered as development-type drilling. Ore discovered by this drilling has led to reopening of five old mines and to the development of three new mines.

Of the 505 holes drilled, 60 are in material of 1 foot or more thick, containing 0.10 percent or more U_3O_8 or 1.0 percent or more V_2O_5 and 63 holes are in material that is either too low grade or too thin to be classed as ore. Drilling through November 1954 has resulted in the discovery of about 80 deposits, some of which have been partly defined.

About 90 percent of the holes were drilled on mining claims or state land and the remainder are on public land.

RESERVES

Total estimated indicated and inferred reserves discovered by Geological Survey drilling in the La Sal Creek area are 103,270 short tons of material 1 foot or more thick that averages 0.26 percent U_3O_8 and 2.11 percent V_2O_5 calculated at a cutoff of 0.10 percent U_3O_8 and 1.0 percent V_2O_5 . This reserve figure is the balance remaining from the original estimated reserve total of 115,240 short tons averaging 0.27 percent U_3O_8 and 2.08 percent V_2O_5 after the known production of 11,970 short tons averaging 0.31 percent U_3O_8 and 1.83 percent V_2O_5 has been subtracted.

The masses of material constituting these reserves range in size from 200 to 20,000 short tons and occur as discontinuous, gently rolling, tabular layers controlled by sedimentary structures. The size and frequency of

occurrence of the deposits and the nature of the ground designated as favorable (fig. 1) indicate that potential reserves will at least equal the original estimated total of indicated and inferred reserves.

The reserves are almost entirely on claimed land and lie at an average depth of 260 feet below the surface. At the present time private industry is actively exploring and developing these deposits so further Government exploration in the area is unnecessary.

PLANS

No additional diamond drilling is planned in the La Sal Creek area by the Geological Survey during 1955 due to the exploration activity by private industry. A roving-drill rig contract involving a minimum of 5,000 feet has been recommended in parts of the Paradox mining district adjacent to the La Sal Creek area for geologic information and to test possible trends of favorable ground.

Mine mapping, resource appraisal, and areal geologic mapping will be continued in the Paradox mining district during 1955. Special attention will be directed to the search for new areas in which wide-spaced diamond-drill exploration by the Geological Survey might be feasible.

UNPUBLISHED REPORTS

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- _____, 1954, Development drilling on the Vanadium Queen group, Paradox district, San Juan County, Utah: U. S. Geol. Survey Trace Elements Memo. Rept. 715.
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- Livingston, C. W., 1945, "West Paradox district, Dolores Plateau area, Colorado-Utah," Union Mines Development Corp. Report.





