GEOLOGIC MAP OF THE UNDERGROUND WORKINGS OF THE HARVE BLACK NO. 2 MINE, NAVAJO COUNTY, ARIZONA

by
Robert Ciesiel[1] and Irving B. Gray[2]

with a text by
William L. Chenoweth[3]

Arizona Geological Survey
Contributed Report 89-E
August 1989

Arizona Geological Survey
416 W. Congress, Suite #100, Tucson, Arizona 85701

[1]Deceased [2]Geologist, Baker, Oregon
[3]Consulting Geologist Grand Junction, Colorado

Interpretations and conclusions in this report are those of the consultant and do not necessarily coincide with those of the staff of the Arizona Geological Survey

GEOLOGIC MAP OF THE UNDERGROUND WORKINGS OF THE HARVE BLACK NO. 2 MINE, NAVAJO COUNTY, ARIZONA

INTRODUCTION

The geologic map of the Harve Black No. 2 mine was recently found in the files of the Grand Junction Projects Office of the U.S. Department of Energy (DOE) in Grand Junction, Colorado. As the DOE has no use for the map (Plate 1), it was given to Chenoweth to donate to the Arizona Geological Survey.

Robert Ciesiel and Irving B. Gray were geologists with the Grand Junction Office of the U.S. Atomic Energy Commission (AEC). During the mid-1950's they mapped the geology of several underground mines in the Monument Valley uranium mining area of Arizona and Utah. The information presented in this text was obtained when the author was also employed by the AEC.

Ore shipments from this property have been identified as the Harvey Black No. 2 and the Spencer No. 1 mines. Since the majority of the ore was shipped under the name of the Navajo holding the mining permit, that name is preferred. Legal documents supplied to the AEC by the Navajo Tribal Mining Department indicate the correct spelling of his first name is Harve not Harvey as has appeared on previous maps (U.S. Atomic Energy Commission, 1959; Young and others, 1964).

Another Navajo, Harvey Blackwater, had five mining permits in Cane Valley adjacent to, and north of the Monument No. 2 mine (Figure 1). A partner of Blackwater in a permit adjacent to Vanadium Corporation of America's Monument No. 2 lease was Jessie Black. The similarity in names has created some confusion in the literature. For example, Johnson and Thordason (1966, plate 1) show the location of the Harvey Black No. 2 deposit adjacent to the Blackwater deposits in Cane Valley.

LOCATION

The Harve Black No. 2 mine is located on the rim of a small mesa approximately 2.5 miles southwest of Goulding Trading Post and Lodge in Navajo County, Arizona (Figure 1). The adit of the mine is some 300 feet above the valley floor.

The mine site is 0.8 miles north of the old dirt road that connects Utah State Highway 47 (now U.S. Highway 163) with Oljeto Trading Post (Figure 1). This road leaves U.S. 163 3.8 miles south of the Arizona-Utah Stateline. The truck trail to the mine leaves the Oljeto road 2.9 miles west of U.S. 163. A road to the top of the mesa was built at the north end of the mesa.

The area is within the Navajo Indian Reservation. Mining permits and leases are issued by the Navajo Tribal Council and are approved by the Bureau of Indian Affairs, U.S. Department of the Interior. Mining permits can only be obtained by individual Navajos, who can assign the mining rights to an individual

or company. Assignments are also approved by the Tribal Council and the Bureau of Indian Affairs. No more than 960 acres of tribal land can be held by any one individual or company.

GEOLOGIC SETTING

The Harve Black No. 2 ore deposit occurred in a channel of the Shinarump Member of the Chinle Formation that trends S 65° W across the mesa. The channel outcrops on both the east and south sides of the mesa. The channel is approximately 200 feet wide and 50 feet deep at the base of Shinarump Member. Its length across the mesa is approximately 1,900 feet.

During an aerial radiometric survey of Monument Valley in 1951, a radioactive anomaly was detected on the southern outcrop of the channel (Cummings, 1952). This anomaly was called Triangle, and that name was given to the channel (Witkind and Thaden, 1963).

Witkind and Thaden (1963) examined the exposures of the channel in 1952 and noted limonite and some secondary copper minerals but no visible uranium-vanadium minerals. Drilling in 1954 located a few small pods of oxidized uranium-vanadium minerals, associated with carbonaceous material, in the channel, southwest of the eastern outcrop. The Harve Black No. 2 mine developed these pods of ore, which averaged 2 feet in thickness (AEC unpublished files). As mapped by Ciesiel and Gray, the channel fill is a limonite-stained conglomeratic sandstone and conglomerate, containing up to 50% interstitial clay (Plate 1). Some ore extended downward into bleached siltstones of the Moenkopi Formation.

A sample of ore (MJM-043) collected from the conglomeratic channel fill, during the National Uranium Resource Evaluation (NURE) program assayed 0.20 % U_3O_8. A petrographic examination of this sample indicated that the grains were cemented with copper sulfides and malachite. A copper uranyl phosphate, meta-torbernite(?), was found as small flakes mixed with the copper minerals (Field and Blauvelt, 1982, Appendix D).

PRODUCTION HISTORY

During the summer of 1953, Harve Black applied to the Navajo Tribal Council for a mining permit to cover a small mesa located 2.5 miles southwest of Gouldings. This mesa was capped with the Shinarump Member of the Chinle Formation which had a mineralized channel in the base of the member. On September 3, 1953, Mining Permit No. 88, covering 137 acres, was approved to Harve and Ada Black. The assignment of the mining rights of the permit to C.L. Spencer of Farmington, New Mexico were approved on December 8, 1953. The property covered by Mining Permit No. 88 was called the Harve Black No. 2.

Harve Black had another mining permit known as the Harve Black No. 1 which covered a small Shinarump capped mesa one mile southwest of the Harve Black No. 2 mesa, no ore was ever developed in it.

Mr. Spencer, operating as Monument Valley Uranium Company, did some 800 feet of drilling behind the outcrop of the channel and located a small amount of ore. An adit was driven into the outcrop of the channel on the east side of the mesa (Plate 1). Monument Valley Uranium shipped 9.52 tons of ore averaging 0.27% U_3O_8 and 0.92% V_2O_5 and containing 51.42 pounds U_3O_8 and 175.24 pounds V_2O_5 to the AEC ore-buying station at Shiprock, New Mexico in the spring of 1954.

In later shipments during 1954 the shipper was listed as C.L. Spencer. Total shipments in 1954 were 47.99 tons of ore that averaged 0.24% U_3O_8 and 0.88% V_2O_5 (Table 1). Initially, a tram was used to move the ore from the portal of the mine to the valley floor, but it was replaced with a truck road up the mesa in 1955.

Mining continued in 1955. During that year C.L. Spencer shipped a total of 134.13 tons of ore averaging 0.21% U_3O_8 and 0.84% V_2O_5 to the AEC ore-buying station at Monticello, Utah (Table 1). Spencer abandoned the mine in the fall of 1955 and cancelled the assignment of his mining permit. Mining Permit No. 88 expired on September 3, 1957.

Ciesiel and Gray mapped the mine as was about to be closed. The mine workings consisted of 120 feet long drift with four small stopes (Plate 1). At that time the mine had produced 182.12 tons of ore that averaged 0.22% U_3O_8 and 0.85% V_2O_5 and contained 790.71 pounds U_3O_8 and 3,093.81 pounds V_2O_5 (Table 1).

On March 14, 1962, Mining Permit No. 569 was issued to Harve and Ada Black. This permit covered the same 137.00 acres as did the original Mining Permit No. 88. On May 23, 1962, A and B Mining Company of Moab, Utah was approved the assignment of 6.48 acres covering the old mine and dump.

During the early 1960's, A and B acquired the mining rights to several inactive mines in Monument Valley. At each mine they produced a small amount of ore as the result of clean up mining and reworking the mine dumps. During May and June 1962, A and B shipped 192.86 tons of ore that averaged 0.23% U_3O_8 and 0.74% V_2O_5 to the mill at Shiprock, New Mexico operated by Kerr-McGee Oil Industries, Inc. (Table 1). A and B cancelled their assignment on February 5, 1963 and the mine has been inactive ever since.

In the 24 months or less that the mine was being operated, it produced a total of 374.98 tons of ore that averaged 0.22% U_3O_8 and 0.79% V_2O_5 and contained 1,689.34 pounds U_3O_8 and 5,961.96 pounds V_2O_5 (Table 1). All of the uranium and vanadium were purchased by the AEC.

REFERENCES

Cummings, W.L., 1952, Airborne radioactivity survey of part of the Navajo Indian Reservation of Utah and Arizona: U.S. Atomic Energy Commission Raw Materials Operations Report RMO-808, 33 p.

Field, M.T., and Blauvelt, R.P., 1982, National uranium resource evaluation, Marble Canyon quadrangle, Arizona and Utah: U.S. Department of Energy Preliminary Folio PGJ/F-22(82), 32 p., 9 illustrations, 7 microfiche.

Johnson, H.S., Jr., and Thordarson, William, 1966, Uranium deposits of the Moab, Monticello, White Canyon, and Monument Valley districts, Utah and Arizona: U.S. Geological Survey Bulletin 1222-H, 53 p.

U.S. Atomic Energy Commission, 1959, Guidebook to uranium deposits of the western United States: Raw Materials Exploration Report RME-141, 359 p.

Witkind, I.J., and Thaden, R.E., 1963, Geology and uranium-vanadium deposits of the Monument Valley area, Apache and Navajo Counties, Arizona, with sections on Serpentine at Garnet Ridge, by H.E. Malde and R.E. Thaden, and Mineralogy and paragenesis of the ore deposit at the Monument No. 2 and Cato Sells mines, by D.H. Johnson: U.S. Geological Survey Bulletin 1103, 171 p.

Young, R.G., Malan, R.C., and Gray, I.B., 1964, Geologic map showing uranium deposits and Shinarump channels in the Monument Valley district, San Juan County, Utah, Navajo and Apache Counties, Arizona: U.S. Department of Energy Preliminary Map 34, scale 1:95,000.

TABLE 1

ORE PRODUCTION, HARVE BLACK NO. 2 MINE, NAVAJO COUNTY, ARIZONA

Year	Tons of Ore	Pounds U_3O_8	$\%U_3O_8$	Pounds V_2O_5	$\%V_2O_5$
1954	47.99	227.38	0.24	840.51	0.88
1955	134.13	563.33	0.21	2,253.30	0.84
1962	192.86	898.63	0.23	2,868.15	0.74
TOTAL	374.98	1,689.34	0.22	5,961.96	0.79

The initial 10 ton shipment in 1954 was made by Monument Valley Uranium Co. Other shipments in 1954 and 1955 made by C.L. Spencer. Shipments in 1962 made by A and B Mining Co.

Source: Unpublished records, U.S. Atomic Energy Commission, Grand Junction Office.

EXPLANATION FOR PLATE 1

/	Fracture
———	Contact between Shinarump Member of the Chinle Formation (Rs) and the Moenkopi Formation (Rm)
▬▬	Petrified log
lim	Limonite stained
cgl	Conglomerate
ss	Sandstone
ms	Mudstone
(30)	Percent clay in a sandstone or mudstone bed
0.1	Radioactivity, measured in mr/hr
altered	Refers to the bleaching of the normally red color of the Moenkopi rocks

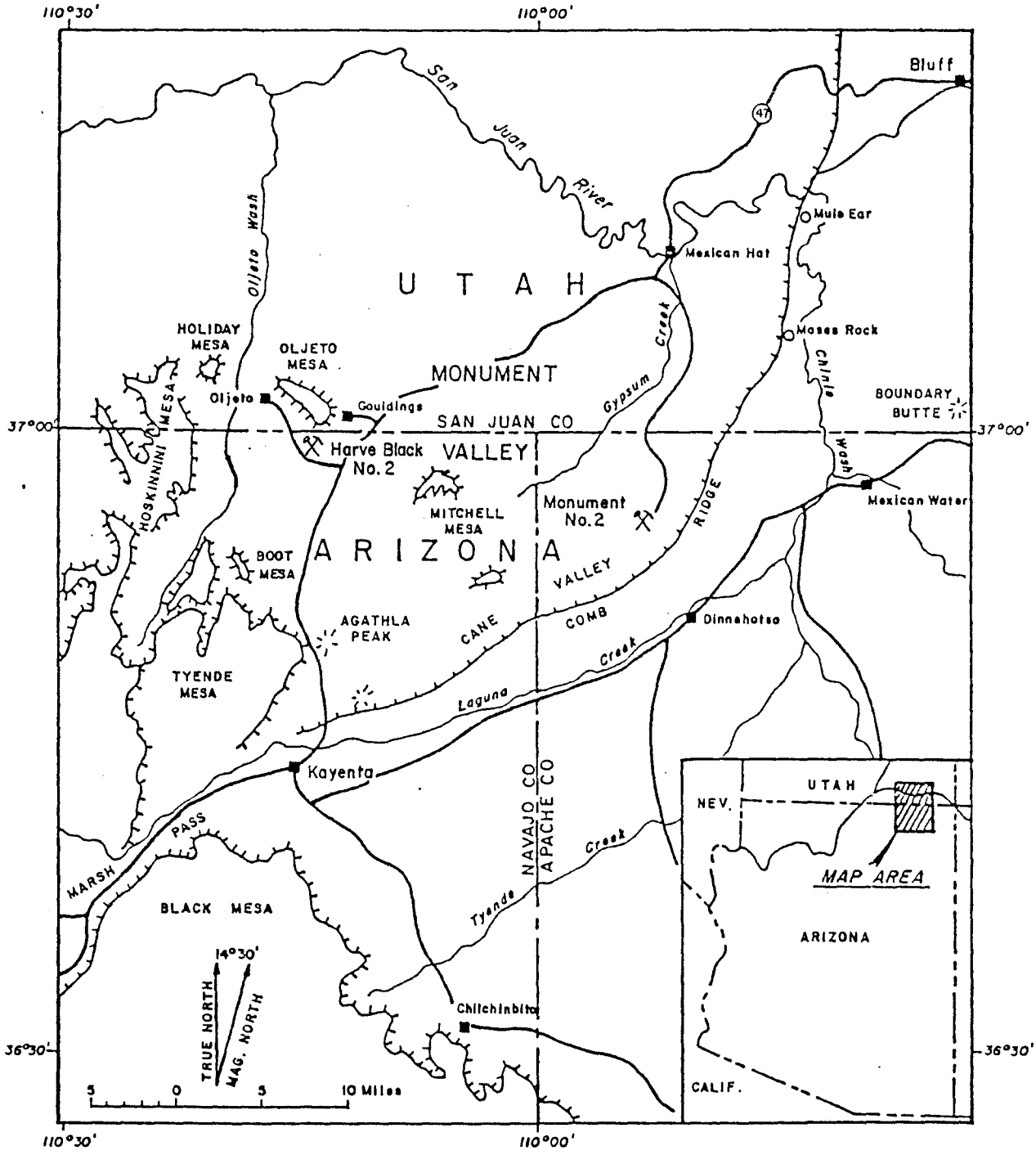

Figure 1. Index map of Monument Valley showing the location of the Harve Black No. 2 mine