GEOLOGY AND PRODUCTION HISTORY OF THE GOLDEN CROWN (GEORGE HARRISON NO. 1) URANIUM MINE, NAVAJO COUNTY, ARIZONA

by

William L. Chenoweth
Consulting Geologist, Grand Junction, Colorado

Arizona Geological Survey
Contributed Report 95-F
April 1995

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

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

INTRODUCTION

The Golden Crown Mine, on George Harrison's Navajo Tribal Mining Permit, was a small oxidized uranium deposit. Unlike other uranium ore deposits in the Monument Valley area, the deposit was not hosted in a paleo-channel in the Shinarump member of the Chinle Formation. The name, Golden Crown, has caused some confusion in the past as Golden Crown Mining Company operated the Orphan Lode Mine within Grand Canyon National Park during 1956 and 1957 [Chenoweth, 1986]. In some newspaper stories, during the uranium boom, the operators of the small mine in Monument Valley were associated with the large Orphan Lode Mine in the Grand Canyon. Information on the Golden Crown Mine was recently located in the files of the U.S. Atomic Energy Commission (AEC) stored at the Grand Junction Projects Office of the U.S. Department of Energy. This brief report summarizes this information.

LOCATION AND LAND STATUS

The Golden Crown Mine was located 17 miles north of Kayenta, Arizona on the west side of U.S. Highway 163, Navajo County, Arizona (Figure 1). It is adjacent to the well known Monument No. 1 and Mitten No. 2 Mines (Evenson and others, 1992). A dirt trail connects the highway to the mines. The Golden Crown Mine was located at 36°57′00" north latitude and 110°13′32" west longitude on the Mystery Valley topographic quadrangle [U.S. Geological Survey, 1988].

The mine was within the Navajo Indian Reservation. In the records of the Navajo Tribal Mining Department, at Window Rock, Arizona it was known as the George Harrison No. 1. Mining permits and leases were issued by the Navajo Tribal Council and approved by the Bureau of Indian Affairs (BIA), U.S. Department of Interior. Mining permits could be obtained by individual Navajos only. Permit holders could assign the mining rights to another individual or a company; these assignments also had to be approved by the Tribal Council and the BIA. Leases could be issued directly by the BIA. Permits were issued for a 2-year period and could be renewed for an additional 2 years. Leases were issued for periods up to 10 years. No more than 960 acres of tribal land could be held by any one company or individual. Both the permittee and the tribe received royalties from ore production. Based on the mine value of the ore, the tribe received between 10% and 20% royalties and the permittee between 2% and 5% royalties.

GEOLOGIC SETTING

The Golden Crown deposit was located 1,000 feet east of a small mesa composed of sediments of the Shinarump Member of the Upper Triassic Chinle Formation, which filled a channel scoured into the top of the underlying Lower Triassic Moenkopi Formation. The Monument No. 1 and the Mitten No. 2 ore bodies (Figure 2), like most uranium ore deposits in the Monument Valley area, were located in the basal part of this channel fill [Evensen and others, 1992]. At the

Golden Crown occurrence, the contact between the Shinarump Member and the Moenkopi Formation is approximately 60 feet higher in elevation than the same contact at the base of the ore-bearing channel, at the base of the mesa. There is no evidence of channeling at the Golden Crown and the host sediments there are probably the equivalent to the rocks capping the Monument No. 1 - Mitten No. 2 mesa.

At the Golden Crown Mine, yellow-colored uranium minerals occurred over a 150 by 50 foot area in an isolated remnant of Shinarump sandstone. The host rock is a limonite stained, coarse-grained sandstone containing abundant light gray, oval, clay pebbles and carbonaceous fossil plant material. Uranium minerals were disseminated in the sandstone adjacent to the clay pebbles.

Uranium minerals identified at this mine include tyuyamunite, autunite, metatorbernite, torbernite and zippeite, the latter four noted as being rare. Rare copper minerals identified included azurite, chrysocolla and malachite [Witkind and Thaden, 1963]. Calcite, limonite and pyrite were common in the ore zone.

PRODUCTION HISTORY

Nothing is known of the early history of this occurrence. No doubt it was claimed by a Navajo during the beginning of the uranium boom in Monument Valley. However, it is not mentioned in any of the Preliminary Reconnaissance Reports on uranium occurrences in the Navajo County area of Monument Valley prepared by AEC geologists in 1950-1952. On a 1952 map of the area, Witkind and Thaden [1964] labeled this occurrence the Monument No. 1 Annex, but did not mention who found it, or controlled it.

Early in 1955, George Harrison staked a claim, known as George Harrison No. 1, contiguous with the east side line of the Monument No. 1 claim covered by Navajo Tribal Mining Permit (MP) No. 77. The claim was surveyed by John H. Veale, C.E. on April 16, 1955. On June 13, 1955, George Harrison was issued MP-310 for the 41.28 acre claim. The legal description of Navajo Tribal Mining Permit No. 310 from the files of the Navajo Tribal Mining Department, Window Rock, Arizona reads as follows:

> "Commencing at corner No. 1, which bears N.11°09'E. 13,021 feet from U.S. Mineral Monument No. 4, also being corner No. 4 of the Monument No. 1 claim, thence No.16°15'W. 1,500 feet to corner No. 2, being corner No. 1 of the Monument No. 1 claim, thence E. 1,250 feet to corner No. 3, thence S. 16°15'E, 1,500 feet to corner No. 4, thence W. 1,250 feet to corner No. 1 the point of beginning, containing 40.28 acres more or less."

The assignment of the mining rights to MP-310 to the Utomic Exploration and Mining Company of Grand Junction, Colorado was approved on August 30, 1955.

Utomic mined the exposed uranium-bearing material from a series of shallow open pits and trenches. In November 1955, Utomic made an initial 33.994 ton shipment, averaging 0.14 percent U3O8, 0.13 percent V2O5 and 0.50 percent CaC03 to the AEC ore-buying station at Shiprock, New Mexico. This shipment was identified to the AEC as coming from the Golden Crown Mine. In December, another 14.70 tons were shipped to Shiprock. Total ore produced in 1955 was 48.69 tons which averaged 0.13 percent U3O8 and 0.13 percent V2O5 (Table. 1).

When an AEC geologist visited the property on March 28, 1966, he noted that about 22 tons of low-grade ore was stockpiled at the mine site and that the mine looked abandoned. During October, 1956 and in early November 1956; approximately 11 tons of the stockpiled material was shipped to both the AEC ore-buying station at Monticello, Utah and to the mill at Tuba City, Arizona operated by the Rare Metals Corporation of America. These two shipments totaled 21.69 tons which averaged 0.12 percent U3O8 and 0.12 percent V2O5 (Table 1). George Harrison's mining permit expired in June 1957 and the property has been idle since that time. Total production from the occurrence was 70.38 tons of ore which averaged 0.13 percent U3O8 and 0.13 percent V2O5 (Table 1). The uranium concentrate produced from this ore was all purchased by the AEC.

Acknowledgments. Audrey Berry, Public Affairs Specialist at the Department of Energy's Grand Junction Projects Office allowed the author to review information on the Golden Crown Mine, stored in the archives. Stephen M. Richard of the Arizona Geological Survey reviewed and improved the manuscript.

REFERENCES

Chenoweth, W. L., 1986, The Orphan Lode Mine, Grand Canyon, Arizona, a case history of a mineralized, collapse-breccia pipe: U.S. Geological Survey Open-File Report 86-510, 126p.

Evensen, C.S. Gray, I.B., Meador, J.R., and Ciesiel, R., 1992, Map and geologic sections of the underground workings of the Monument No. 1 and Mitten No. 2 uranium - vanadium mines, Navajo County, Arizona, with a text by W.L. Chenoweth: Arizona Geological Survey Contributed Report CR-92-A, 9p., 1 fig.

U.S. Geological Survey, 1988, Mystery Valley quadrangle, Arizona-Utah: 7.5 - minute series (topographic), provisional, scale 1:24,000.

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, 171p. 7 sheets.

Table 1. Ore production from the Golden Crown Mine, Navajo County, Arizona

Year	Quarter	Tons of Ore	Pounds U_3O_8	% U_3O_8	Pounds V_2O_5	% V_2O_5	Delivery Point
1955	4th	48.69	127.5	0.13	126.6	0.13	Shiprock
1956	4th	21.69	50.1	0.12	54.2	0.12	Monticello, Tuba City
Mine Total		70.4	178.3	0.13	180.76	0.13	

Source: Unpublished ore production records, U.S. Atomic Energy Commission, Grand Junction, Colorado office.

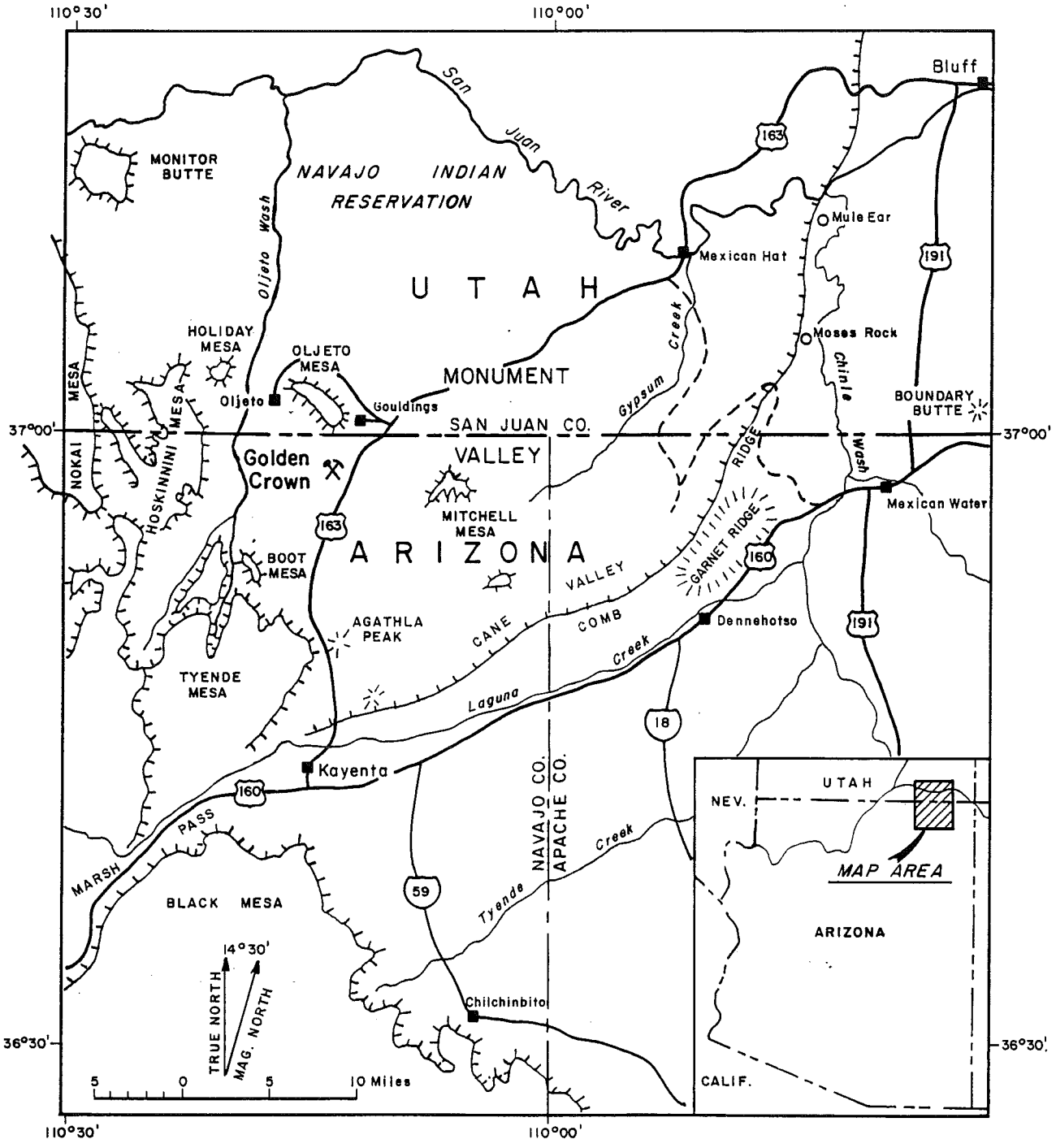

Figure 1. Index map of Monument Valley, Arizona - Utah showing the location of the Golden Crown (George Harrison No.1) uranium mine.

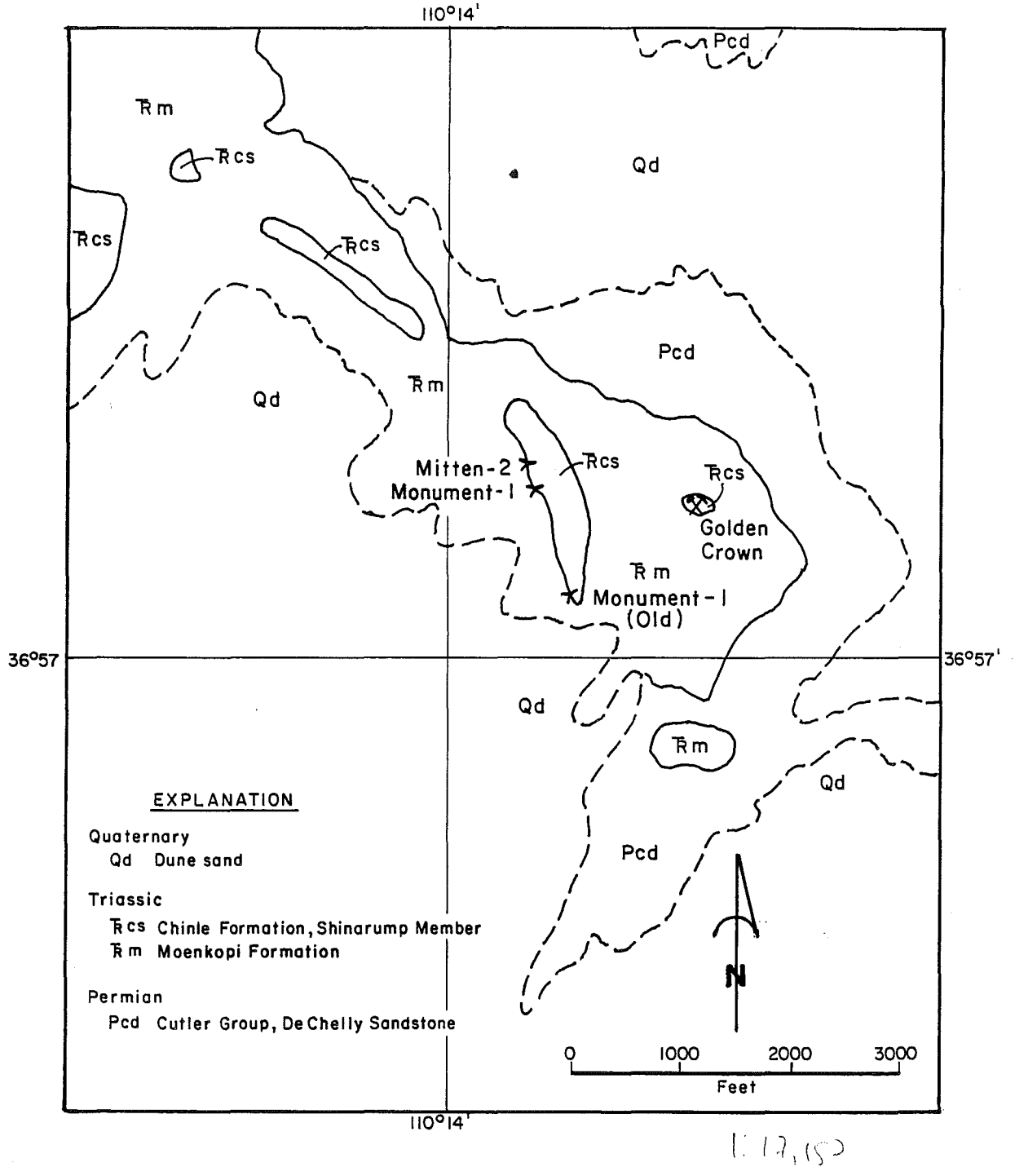

Figure 2. Geologic map of the Monument No. 1 and Golden Crown mines area. After Witkind and Thaden (1963)