

**GEOLOGY, EXPLORATION, PRODUCTION HISTORY OF
THE ALONGO AND RED WASH URANIUM-VANADIUM
MINES ON H.S. BEGAY'S MINING PERMITS,
SAN JUAN COUNTY, NEW MEXICO**

New Mexico Bureau of Mines and Mineral Resources

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INTRODUCTION

The Alongo and Red Wash Mines were developed on surface exposures of uranium - vanadium minerals exposed in the canyon of Red Wash on ground claimed by Hosteen Setah Begay. The mines, in the Salt Wash Member of the Morrison Formation, produced a small amount of uranium - vanadium ore in 1952 and 1956. This report is part of an ongoing study of the uranium deposits in New Mexico, especially in the King Tutt Mesa area of the eastern Carrizo Mountains, San Juan County.

Purpose

The purpose of this brief report is to correct some errors, based on new information, in a previous report the author prepared for the Department of Energy (Chenoweth, 1980), that were repeated by Anderson (1981) of the Bureau of Mines and Mineral Resources. Ore production records of the U.S. Atomic Energy Commission (AEC) that were available to the author in 1980 indicated that during 1950-1952, Hosteen Setah Begay shipped 497 tons of uranium-vanadium ore from a Canyon View Mine in San Juan County, New Mexico. The Navajo Tribal Mining Department, at Window Rock, Arizona, had indicated to the AEC that Canyon View was the name of a mining permit (claim) Mr. Begay was issued southeast of King Tutt Mesa.

In the earlier report, the Canyon View ore production was credited to the old mine on Mr. Begay's mining permit. A later examination of the mine workings by the author suggested this small mine could not have been the source of nearly 500 tons of ore. A review of Navajo royalty records, kept by the Bureau of Indian Affairs, and maps of Vanadium Corporation of America's (VCA) mines in the King Tutt Mesa area, indicated the Canyon View Mine was on VCA's Plot 7 tract near Oak Springs, where Mr. Begay was a contractor for VCA (Chenoweth, 1996). The records also indicated the ore mined from Mr. Begay's mining permit was shipped as having originated at the Red Wash Mine.

Location

The Alongo and Red Wash Mines are located on the east rim of the canyon of Red Wash, southeast of King Tutt Mesa. (Figure 1). The mines are not shown on Horse Mesa 7 ½' topographic quadrangle (U.S. Geological Survey, 1982). The Alongo Mines are latitude 109° 00' 28"W and longitude 36° 42' 27"N. The Red Wash Mine is 2,100 ft south southwest of the Alongo Mines (Figure 2).

The Alongo Mines consist of two adits 150 ft apart. The northern ore is a drift approximately 45 ft long and the southern one is a 65 ft long drift. The Red Wash Mine is a 45 ft long drift with a 10 ft crosscut (Figure 3).

When the mines were being operated, they were accessible by turning off the Red Rock - Oak Springs road at Blackrock Wash. A unimproved dirt road proceeded down the valley of Blackrock Wash to a group of hogans near the confluence of Blackrock Wash and

Red Rock Wash. The mines are located on the east side of Red Wash a quarter of a mile beyond the confluence.

Land Status

The area is within the Navajo Indian Reservation. Mining permits and leases were issued by the Navajo Tribal Council and approved by the Bureau of Indian Affairs (BIA), U.S. Department of the Interior. Mining permits could only be obtained by individual Navajos. Permit holders could subsequently assign the mining rights to another individual or a company; similar to the permits, these assignments 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 percent and 20 percent royalties and the permittee between 2 percent and 5 percent royalties.

In addition to mining permits, the tribe issued drilling and exploration permits. These permits were good for 120 days and were not renewable.

Source of Information

Most of the information presented in this report was obtained while the author was employed by the U.S. Atomic Energy Commission (AEC) and succeeding agencies: the U.S.

Energy Research and Development Administration and the U.S. Department of Energy, including a field examination in 1981. The map of the latest mining permit was photocopied from AEC files now in the possession of the Department of Energy, Grand Junction, Colorado.

GEOLOGIC SETTING

The uranium - vanadium orebodies at the Red Wash and Alongo Mines occur in the Salt Wash Member of the Morrison Formation (Upper Jurassic). In the King Tutt Mesa area, the Salt Wash Member is approximately 220 ft thick. It is composed of light gray, fine- to very fine-grained, well rounded, quartz sandstone with interbedded lenses in beds of reddish-brown and greenish-gray mudstone and siltstone. The mudstone and siltstone beds comprise between 5 to 45 percent of the total thickness of the member. Huffman and others (1980) have subdivided the Salt Wash Member in the King Tutt Mesa area into three stratigraphic units based on depositional environments. The lowermost unit is an average of 30 ft thick and was considered by those authors to be predominantly overbank deposits of alternating thin mudstone and sandstone. It reportedly contains a few channel sandstones, however, the present author notes that this unit is lithologically distinct from the overlying ore-bearing unit. It, also, does not host any uranium-vanadium ore deposits.

The middle stratigraphic unit is an average of 70 ft thick and is composed of channel-sandstone deposits, partially and completely abandoned channel-fill deposits, and overbank deposits. It rests with sharp erosional contact on the lower unit. Approximately 80 percent

of the sandstone in this unit represents active channel fill in a generally eastward flowing fluvial system (Craig and others, 1955).

The uranium - vanadium deposits in the King Tutt Mesa area occur in carbonaceous sandstones in the middle unit. The mines on H.S. Begay's mining permits are in sandstones approximately 40 ft above the base of the Salt Wash.

The upper unit is 120 ft thick. Most of the unit is composed of braided-stream deposits, and thin overbank deposits. Active channel-fill sandstone and conglomerates are also present. The sequence of stratigraphic units probably represent a prograding wet alluvial fan (Huffman and others, 1980).

The uranium - vanadium orebodies were formed by the selective impregnation of the sandstone and absorption by the mudstone and fossil plant material. Orebodies were commonly associated with detrital plant fragments in the sandstone. The orebodies at both the Red Wash and Alongo Mines were apparently very small and were less than 1.5 ft thick. Thin streaks of uranium - vanadium minerals are still visible at the mine portals.

The bright yellow uranium mineral in the Carrizo ore deposits was originally called carnotite, a potassium uranium vanadate. Later work by Corey (1958) and S.R. Austin (written communication, 1967) identified tyuyamunite, a calcium uranium vanadate, and meta-tyuyamunite as the only uranium minerals in the Carrizo deposits. The mineralogy of the Nelson Point Mine on King Tutt Mesa was studied by Corey (1958). In this mine, vanadium clay and montrosite were present. These minerals have been oxidized to form a number of secondary vanadium minerals that include sherwoodite, duttonite(?), hewettite,

metahewettite, rossite, metarossite, and hendersonite (Corey, 1958). Calcite is a common cement in ore. Pyrite, iron oxides, and gypsum may also be present.

Salt Wash strata at the Alongo Mines dip two degrees to the east due to the influence of the Red Rock monocline which lies directly west of King Tutt Mesa and where the older Jurassic rocks have eastward dip as great as 10 degrees.

EXPLORATION AND PRODUCTION HISTORY

During a survey of the uranium - vanadium resources of the Salt Wash Member of the Morrison Formation in the eastern Carrizo Mountains in 1944, Coleman (1944) described four outcrops of uranium - vanadium minerals where Hosteen Setah Begay would later stake a claim. The exposures were numbered S-W1 through S-W4, and were described as up to 159 ft long and ranging from 0.2 to 1.5 ft in thickness with some vanadium and uranium minerals present (Coleman, 1944, p. 12). The exposures were not rich enough to be of interest to VCA although they were mining vanadium ore in the nearby King Tutt Mesa - Oak Springs area during the period 1942-1947.

On April 26, 1952, Hosteen Setah Begay was issued Navajo Tribal Mining Permit No. 25 for the Canyon View claim on the east rim of Red Wash, east of milepost 21.5 on the Arizona-New Mexico State line. In June 1952, Mr. Begay, an experienced miner, shipped 60.55 tons of ore averaging 0.10 percent U_3O_8 and 0.52 percent V_2O_5 to the AEC's ore-buying station at Shiprock, New Mexico (Table 1). The mine was developed on Coleman's S-W3 outcrop and the shipments were identified at the ore-buying station as the Red Wash Mine. This created some confusion in the AEC records, as in 1950, Leroy Pettigrew had

shipped some ore from a small mine on the south side of Horse Mesa, also called the Red Wash Mine. After making these shipments, the mine was abandoned and the mining permit expired in 1954.

On August 10, 1955, Hosteen Setah Begay was issued Mining Permit No. 336 for 119.78 acres in the same area as his old Mining Permit No. 25. The assignment of the mining rights to the permit were approved to E.J. Alongo, of Los Angeles, California, on September 29, 1955.

Mr. Alongo drilled 32 holes, totaling 1,600 feet, behind the mineralized outcrops (Coleman's S-W1, S-W2), but found no ore. He drifted into the two outcrops and accumulated a 10.62 ton stockpile which he shipped to the mill at Shiprock, New Mexico, on February 18, 1956. The mill was operated by Kerr-McGee Oil Industries, Inc. This trial shipment assayed 0.13 percent U_3O_8 , 0.10 percent V_2O_5 and 16.20 percent $CaCO_3$. Since the mill used an acid leach circuit and the lime content exceeded 6.00 percent $CaCO_3$, Mr. Alongo was penalized \$3.70 per ton for lime content of the ore. Ores containing excess of 6.00 percent $CaCO_3$, were penalized \$1.00 per ton for the first percent over 6.00 percent and \$0.30 per ton for each additional percent.

In March 1956, an additional 16.12 tons averaging 0.15 percent U_3O_8 , 0.17 percent V_2O_5 and 14.00 percent $CaCO_3$, were shipped. After this shipment, Mr. Alongo informed the AEC he was going to abandon the property due to the high lime content and the low grade of the ore. Total production by Mr. Alongo was 26.74 tons of ore that averaged 0.14

percent U_3O_8 , 0.14 percent V_2O_5 and 14.87 percent CaCO_3 , (Table 1). Both shipments were identified as coming from the Alongo Mines.

No further mining was done on Mining Permit No. 336 and it expired in August 1957.

Summary

There has been some confusion in past reports since Hosteen Setah Begay's original mining permit (claim) was called Canyon View Mine and he mined at the Canyon View Mine on a nearby VCA lease as a contractor. However, the first shipment from his original mining permit (Canyon View) was identified as the Red Wash Mine. Later shipments from a new mining permit, in the same area, were called the Alongo Mine.

The mines on Hosteen Setah Begay's mining permits were never economic. Small, thin, low grade orebodies were characteristic of this area of the eastern Carrizo Mountains.

Acknowledgments

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U.S. Geological Survey, 1982, Horse Mesa quadrangle, Arizona-New Mexico: 7 ½ minute series (topographic) provisional, scale 1:24,000.

Legal Description Mining Permit No. 337

Beginning at corner No. 1, thence S21°00'W, 3200 ft to corner No. 2; which bears S69°34'W, 9794 ft to Milepost 21 ½ on the Arizona-New Mexico State line; thence S40°00'E, 2177 feet to corner No. 3; thence N13°51'E, 3194 ft to corner No. 4; thence N33°12'W 1858 ft to corner No. 1, the point of beginning. Containing 119.78 acres, more or less.

From the files of the Navajo Tribal Mining Department, Window Rock, Arizona.

Table 1. Uranium-vanadium ore shipments from Hosteen Setah Begay's Mining Permits

Mine Name	Shipper	Year	Tons of Ore	Pounds U_3O_8	% U_3O_8	Pounds V_2O_5	% V_2O_5
Red Wash	H.S. Begay	1952	60.55	127.01	0.10	636.32	0.53
Alongo	A.J. Alongo	1956	26.74	75.96	0.14	76.04	0.14

Source: Unpublished AEC ore production records.

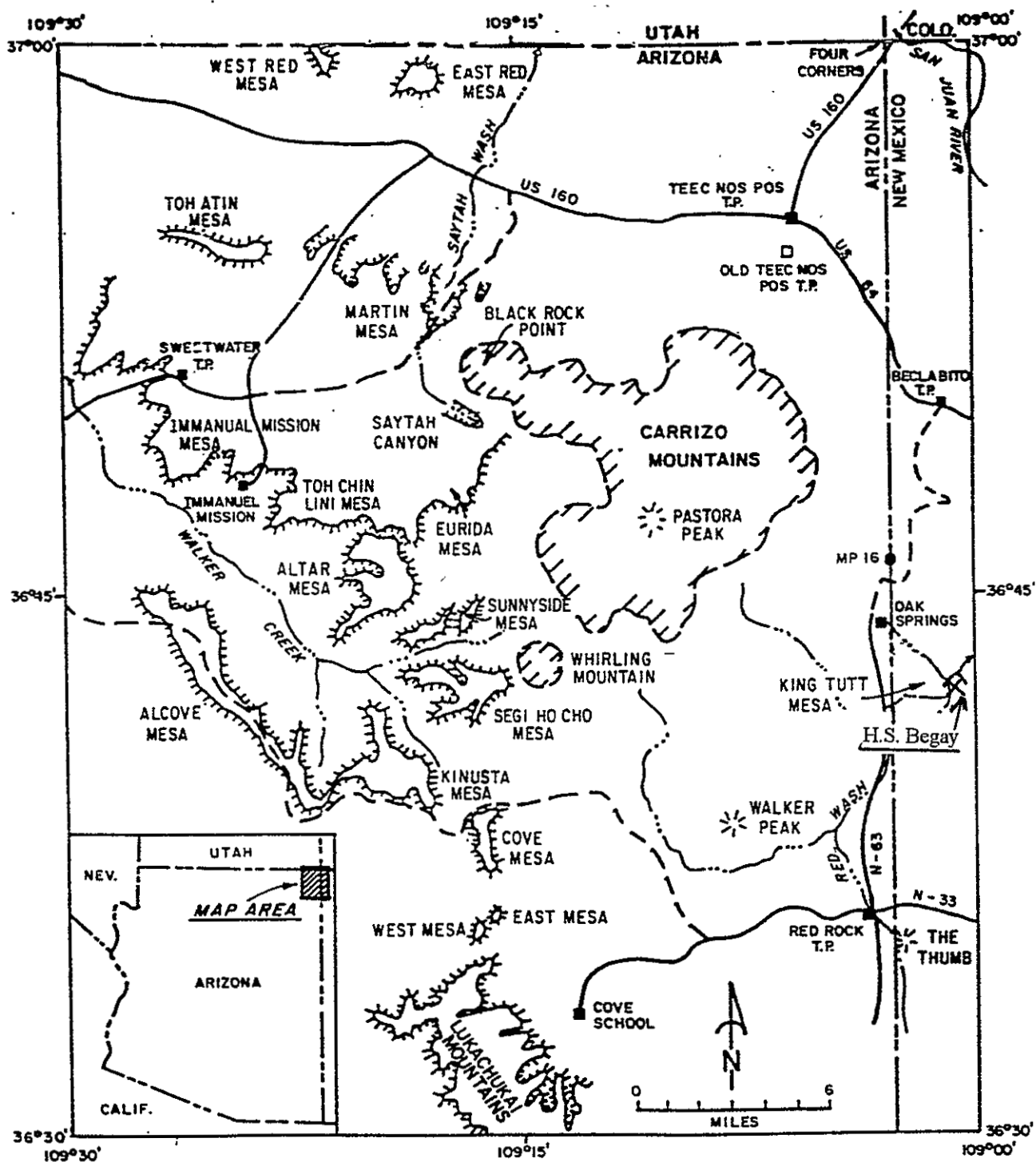


Figure 1. Index map of the Carrizo Mountains showing the location of Hosteen Setah Begay's mining permits.

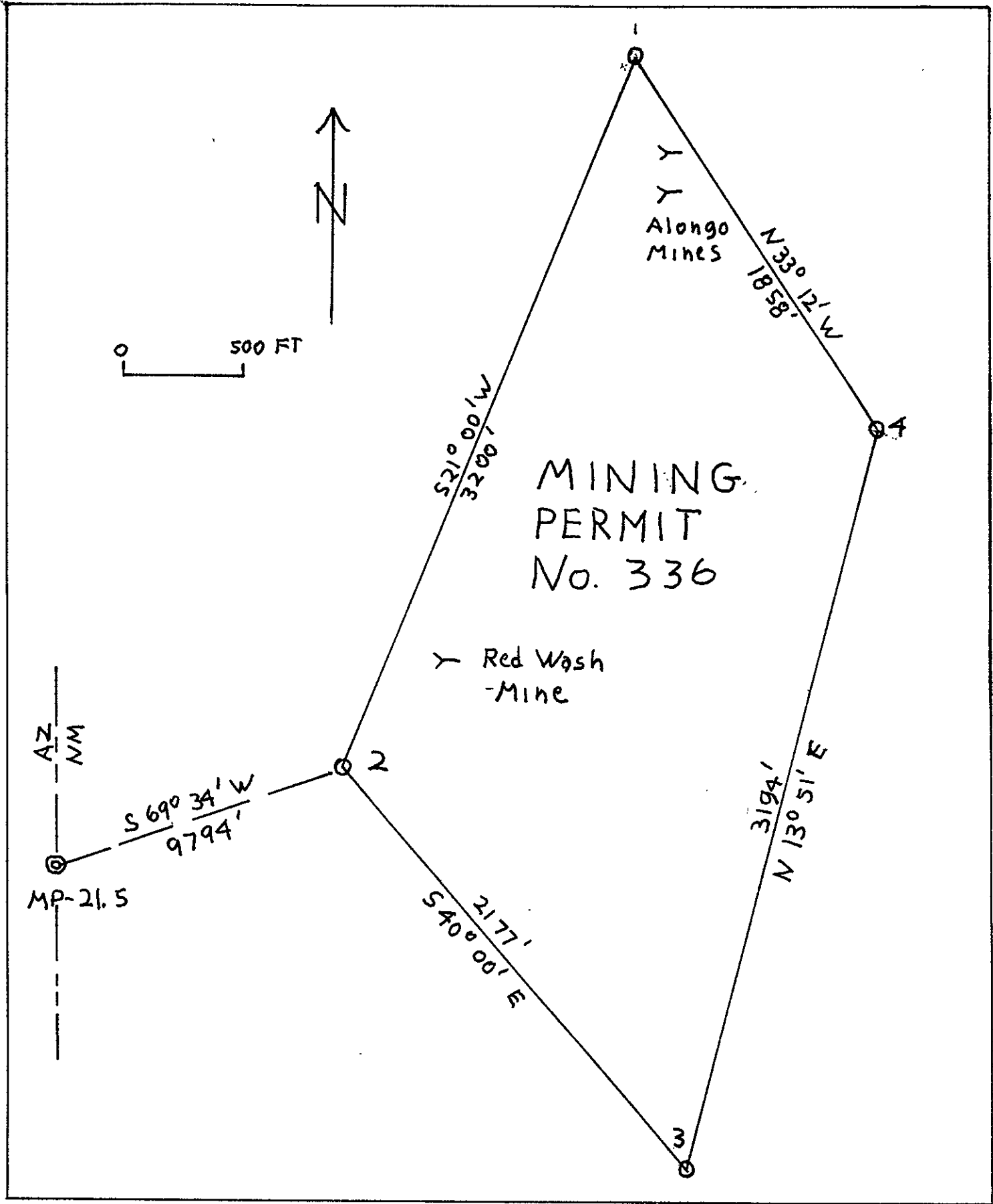


Figure 2. Map of Navajo Tribal Mining Permit No. 336 showing the location of the Alongo and Red Wash Mines (from AEC files).

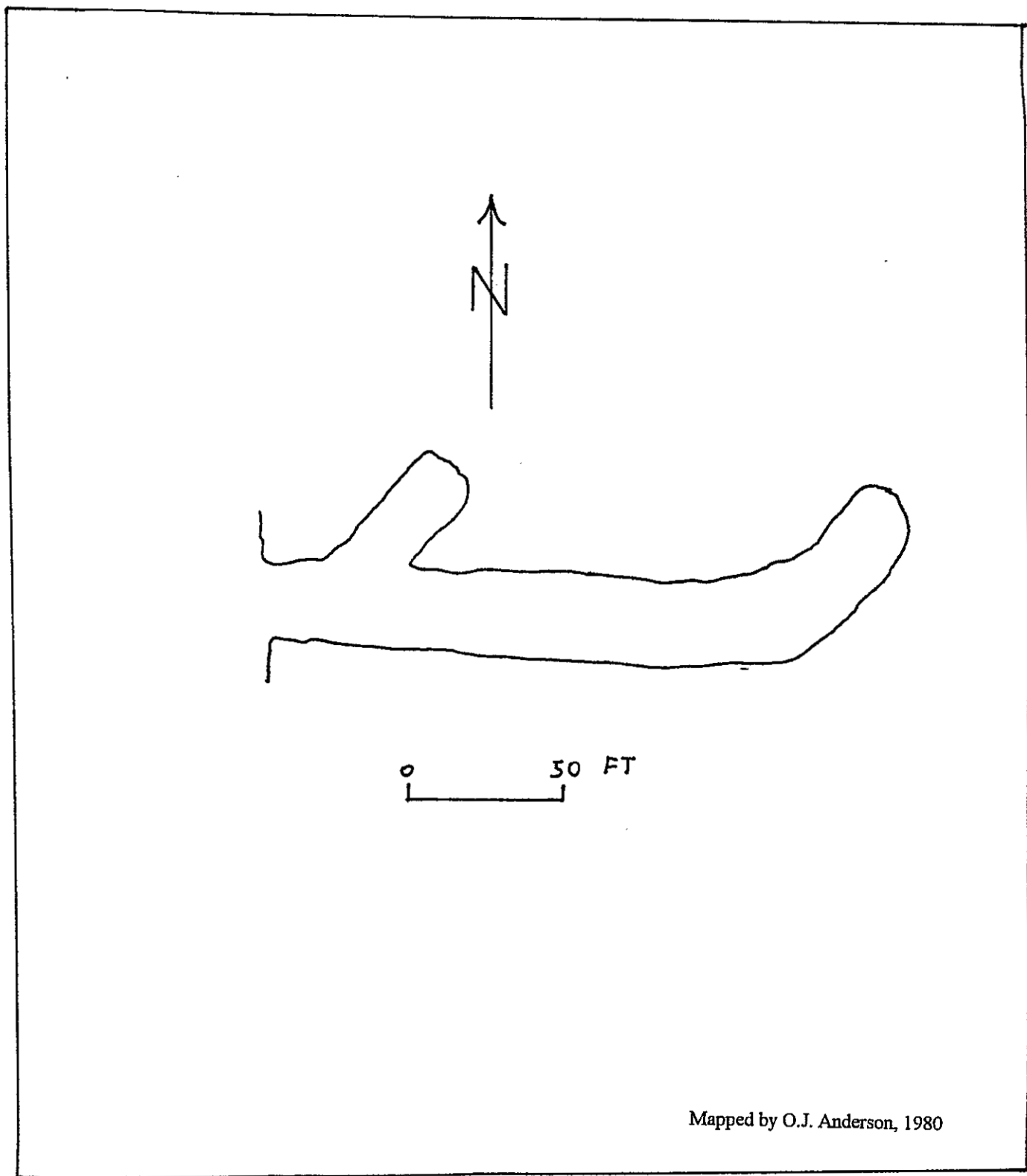


Figure 3. Plan map of the Red Wash Mine, San Juan County, New Mexico, source of 61 tons of ore mined in 1952.