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UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

THE TUNGSTEN QUEEN VEIN, HIGHLAND RIDGE ROADLESS
AREA, WHITE PINE COUNTY, NEVADA

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This open file report summarizes the results of a Bureau of Mines site-specific study in a wilderness study area. The report is preliminary and has not been edited or reviewed for conformity with the Bureau of Mines editorial standards. Work on this study was conducted by personnel from Intermountain Field Operations Center, Denver, CO 80225

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a Bureau of Mines site-specific mineral investigation of part of the Highland Ridge Roadless Area in the Humboldt National Forest, White Pine County, Nevada. The Highland Ridge Roadless Area was classified as a further planning area during the Second Roadless Area Review and Evaluation (Rare II) by the U.S. Forest Service, January 1979.

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THE TUNGSTEN QUEEN VEIN, HIGHLAND RIDGE
ROADLESS AREA, WHITE PINE COUNTY, NEVADA

By

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SUMMARY

The Tungsten Queen vein, which was mined at the Tungsten Queen Mine between 1940-1945, extends into the Highland Ridge Roadless Area, White Pine County, Nevada. In the roadless area the vein can be traced in outcrop for about 600 ft before it disappears under surface cover. Its total strike extent is not known. A resource of 75,000 tons of material grading 0.3 percent WO_3 was inferred for the outcropping part of the vein.

INTRODUCTION

In May of 1984 the Bureau of Mines (Bureau) investigated in detail part of the Highland Ridge Roadless Area, White Pine County, Nevada (fig. 1). This investigation focused on the Tungsten Queen vein and was a follow-up study of an earlier 1980-81 field investigation of the larger roadless area study (Brown, 1983). This vein is the eastern extension of the vein at the Tungsten Queen Mine, located about 500 ft west of the roadless area in the Shoshone mining district (formerly the Minerva district). Bureau personnel investigated the tungsten-bearing vein to determine the amount of critical resources that may be present.

More than 90 percent of the world's estimated tungsten resources are located outside the United States. It is estimated that in 1985 domestic mine production of tungsten will be 2,000 tons and U.S. apparent consumption will be 11,000 tons. From a 1983 base, U.S. demand for tungsten is expected to increase at an average annual rate of about 15.9 percent through 1990. (See Mineral Commodity Summaries, 1985, p. 169.)

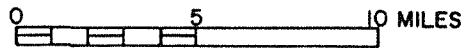
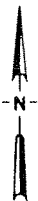
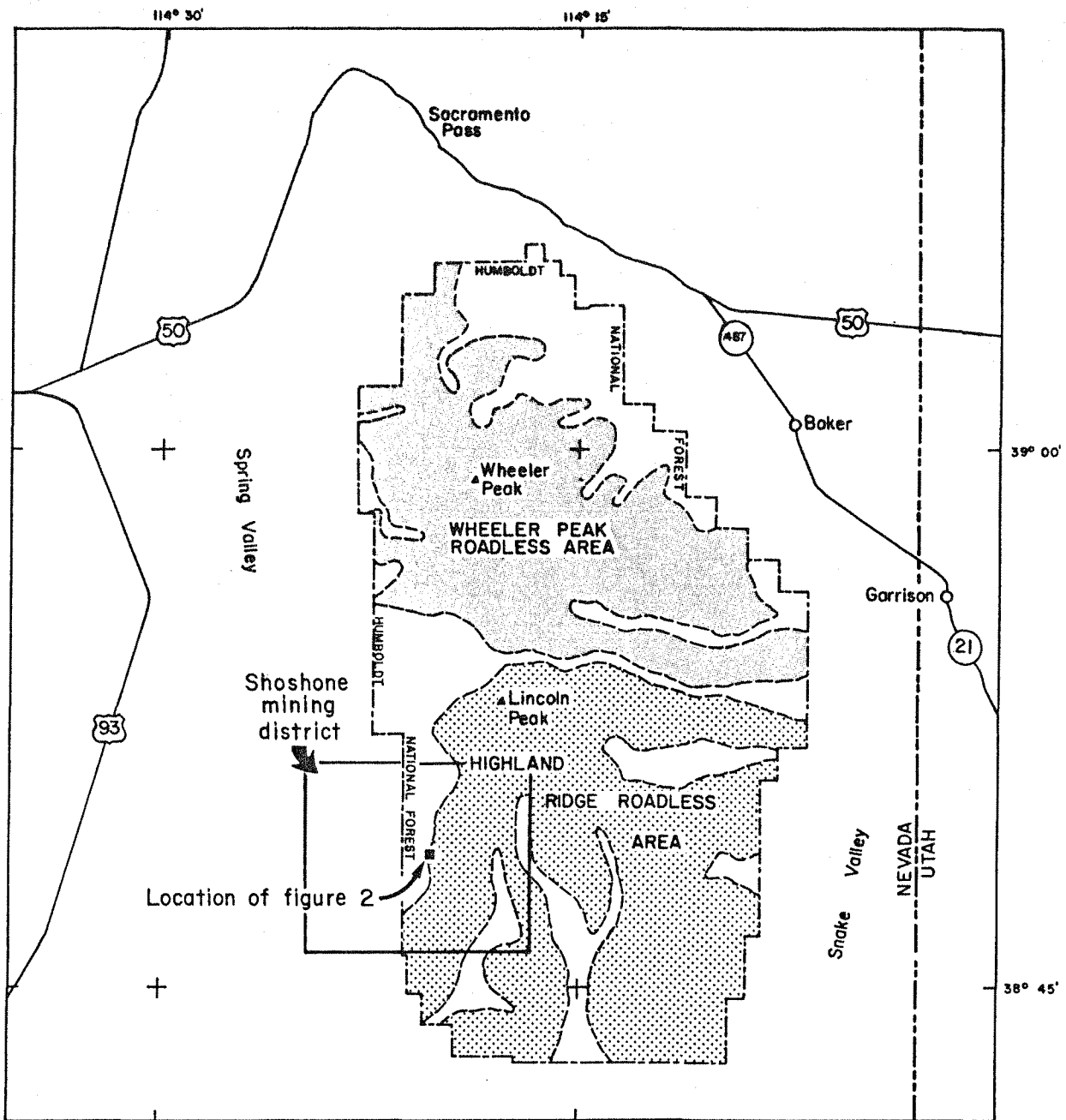


Figure 1.--Index map of the Highland Ridge Roadless Area and vicinity, White Pine County, Nevada.

Geographic setting

The Highland Ridge Roadless Area is in the southern Snake Range, in the Humboldt National Forest, in eastern White Pine County, Nevada. The rugged northerly trending Snake Range is bounded on the west by Spring Valley and on the east by Snake Valley. Lincoln Peak (11,597 ft) is the highest point in the Highland Ridge Roadless Area; the lowest altitude is about 6,200 ft at the southwest border of the roadless area, near the base of the Snake Range.

The part of the roadless area studied for this investigation is on the west side, near the base of the range, at an elevation of about 7,400 ft. Access to the Tungsten Queen vein is from Highway 93, a paved road, a gravel road, and a jeep trail.

Previous investigations

Other than the Bureau of Mines Open File Report MLA 65-83 (Brown, 1983), a comprehensive geologic report of the ore deposits in the Minerva (Shoshone) district by Lemmon (1944) discusses the Tungsten Queen Mine. Other reports (Hose and others (1976), Lincoln (1923), and Newman and others (1950)) describe the geology and ore deposits of the Shoshone district, but deal only with the larger mines and deposits.

Method of investigation

The extension of the Tungsten Queen vein was mapped by tape and compass methods. The vein was examined at night by ultraviolet light so that the distribution of scheelite mineralization could be observed. Of the nine samples taken, six were chip samples from the vein. Samples were taken throughout the length of the exposed vein, where the vein was clearly exposed. In addition, a select sample was taken of scheelite-rich rock on a dump to determine tungsten values in high grade material. Two samples were

taken from a nearby adit that did not intersect the vein, to check for possible tungsten values.

All samples were fire assayed for gold and silver, and analyzed for tungsten by the x-ray fluorescence method. Six of the 9 samples were chosen at random to be analyzed spectrographically for 40 elements at the Bureau of Mines Reno Research Center.

MINING ACTIVITY

The Shoshone mining district was a major tungsten producer from 1940 to 1945. Production records for this district are either incomplete or not available for publication, but production probably exceeded \$2 million (Hose, 1976). Five mines in the Shoshone district produced more tungsten than the Tungsten Queen Mine, the largest being the Chief-Silver Bell Mine, 1-1/2 mi south of the Tungsten Queen Mine. The Tungsten Queen Mine was a small producer, with total production of less than 1,000 short ton units of WO_3 .

GEOLOGY AND MINERALIZATION

The tungsten deposits in the Shoshone district are in quartz-calcite veins hosted in limestone of Middle Cambrian age. Within the quartz-calcite veins, tungsten and minor silver occur in ore shoots. The longest vein known (at the Chief-Silver Bell Mine) is traceable for about 4,000 ft along strike and 500 ft along the dip. Within this vein, the longest ore shoot is about 900 ft along strike. The veins are as thick as 30 ft but the maximum thickness of an ore shoot in the quartz veins is about 10 ft. The grade of ore mined in the district averaged nearly 1 percent WO_3 ; the concentrates reportedly contained as much as 4 oz silver per ton (Lemmon, 1944, p. 9, 10).

In the Tungsten Queen Mine, about 500 ft west of the roadless area, an ore shoot was mined for about 250 ft along strike and at least 200 ft down

dip. The thickness of the ore shoot varied between 1 and 6 ft and averaged about 2 ft (Lemmon, 1944). Prior to the major mining activity at the Tungsten Queen, there was an estimated reserve of 400 tons of indicated ore averaging more than 1.0 percent WO_3 , with assays ranging from 0.39 to 4.2 percent WO_3 (Lemmon 1944).

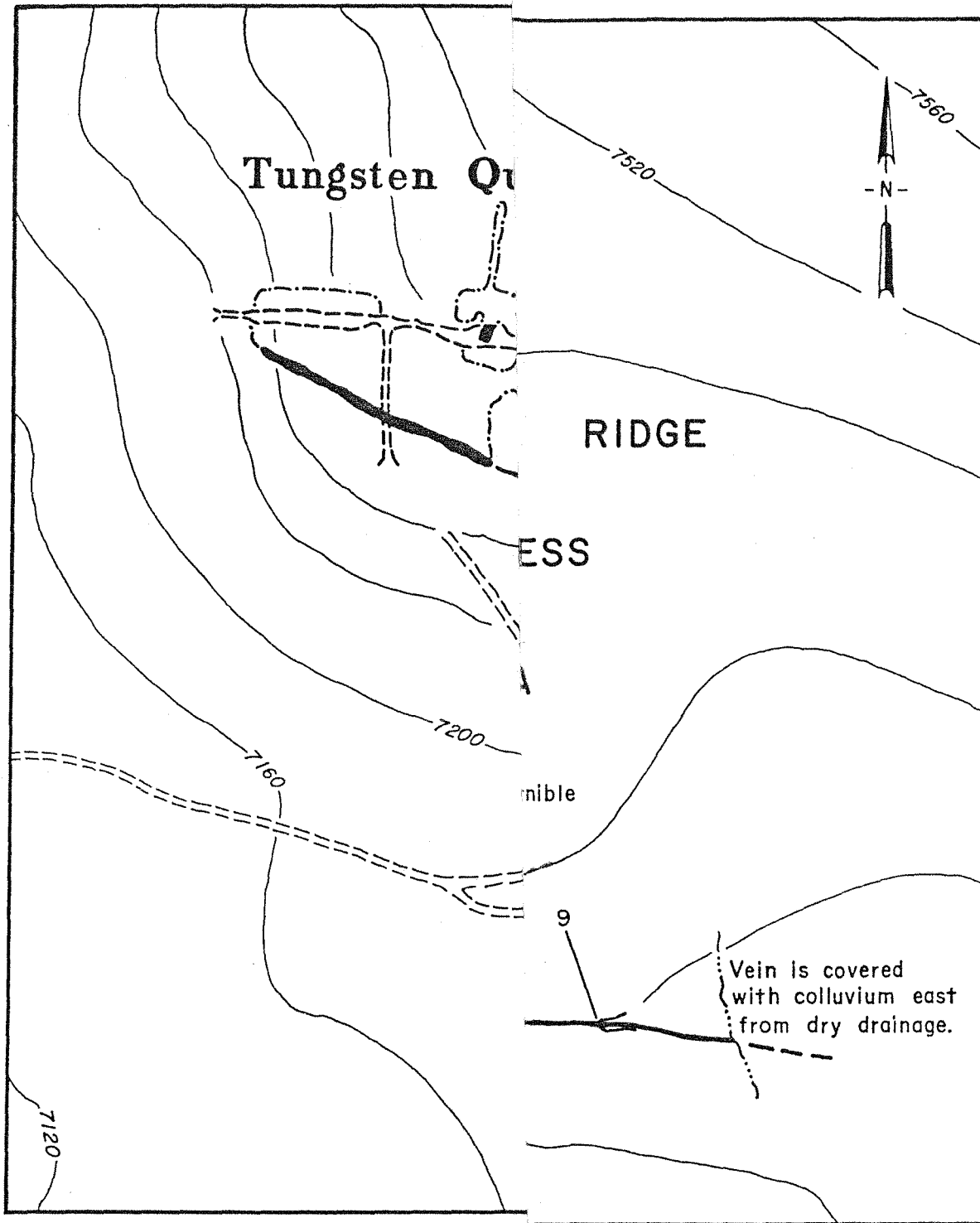
PRESENT INVESTIGATION

The purpose of this study was to delineate any tungsten resources inside the Highland Ridge Roadless Area. The eastern extension of the Tungsten Queen vein was found to extend into the roadless area and the portion of the vein exposed in the roadless area was mapped and sampled.

The eastern extension of the Tungsten Queen vein crops out for at least 600 ft in the Highland Ridge Roadless Area (fig. 2). The vein was not continuously exposed for the entire 500 ft between the Tungsten Queen Mine and the exposures inside the roadless area, due to faulting and horsetailing of the vein. In the roadless area, the vein could not be traced farther to the east due to ground cover.

As determined by ultraviolet light examination, disseminated scheelite occurs throughout the vein and is concentrated locally. Assay results (table 1) support this observation. Of the samples taken from the vein, sample 3 has the highest tungsten value (0.72 percent WO_3) and sample 9 the lowest (0.01 percent WO_3) (table 1). Sample 8 has a high tungsten value (8.0 percent WO_3), but this is a select sample of the scheelite-rich vein material from the dump of a trench. At this trench, a small pocket of high-grade ore had been dug out of the vein.

Samples 1 and 2 were taken in an 80-ft-long adit (fig. 2), that was driven to intersect the vein at depth, but it was not driven far enough to



- APPROXIMATE
- ▲85 VEIN--Shown
- UNDERGROUND
- - - STOPING AREA

Table 1.--Sample and assay data for samples 1-9 from the Tungsten Queen vein, White Pine County, Nevada.

[---, not detected; ***, not applicable]

No.	Sample		Assay data			Remarks
	Type	Length (feet)	Au oz/ton	Ag	WO ₃ percent	
1	Chip	1.5	---	---	---	80 ft adit; calcite-quartz vein, calcite predominates; scheelite not observed in adit; country rock is massive gray-black limestone.
2	Do.	1.0	---	---	---	Same adit as sample 1; calcite vein and minor quartz.
3	Do.	3.0	---	---	0.72	Quartz-calcite vein; some intermixed limestone country rock.
4	Do.	4.0	---	0.2	.13	Quartz-calcite vein; abundant scheelite observed under blacklight.
5	Do.	2.5	---	.4	.33	Do.
6	Do.	4.0	---	.3	.45	Small prospect pit; quartz-calcite vein, quartz predominates; minor scheelite observed under blacklight.
7	Do.	4.0	---	.2	.09	Trench, 4.5 ft deep; zoned vein with quartz in middle and calcite on sides; quartz is vuggy; no scheelite seen in place, abundant scheelite on dump.
8	Grab, select	***	---	.1	8.0	Dump of same trench as sample 7; abundant scheelite observed under blacklight
9	Chip	4.0	---	---	.01	Trench, 2 ft deep; quartz-calcite vein and intermixed limestone country rock; sparse scheelite seen under blacklight.

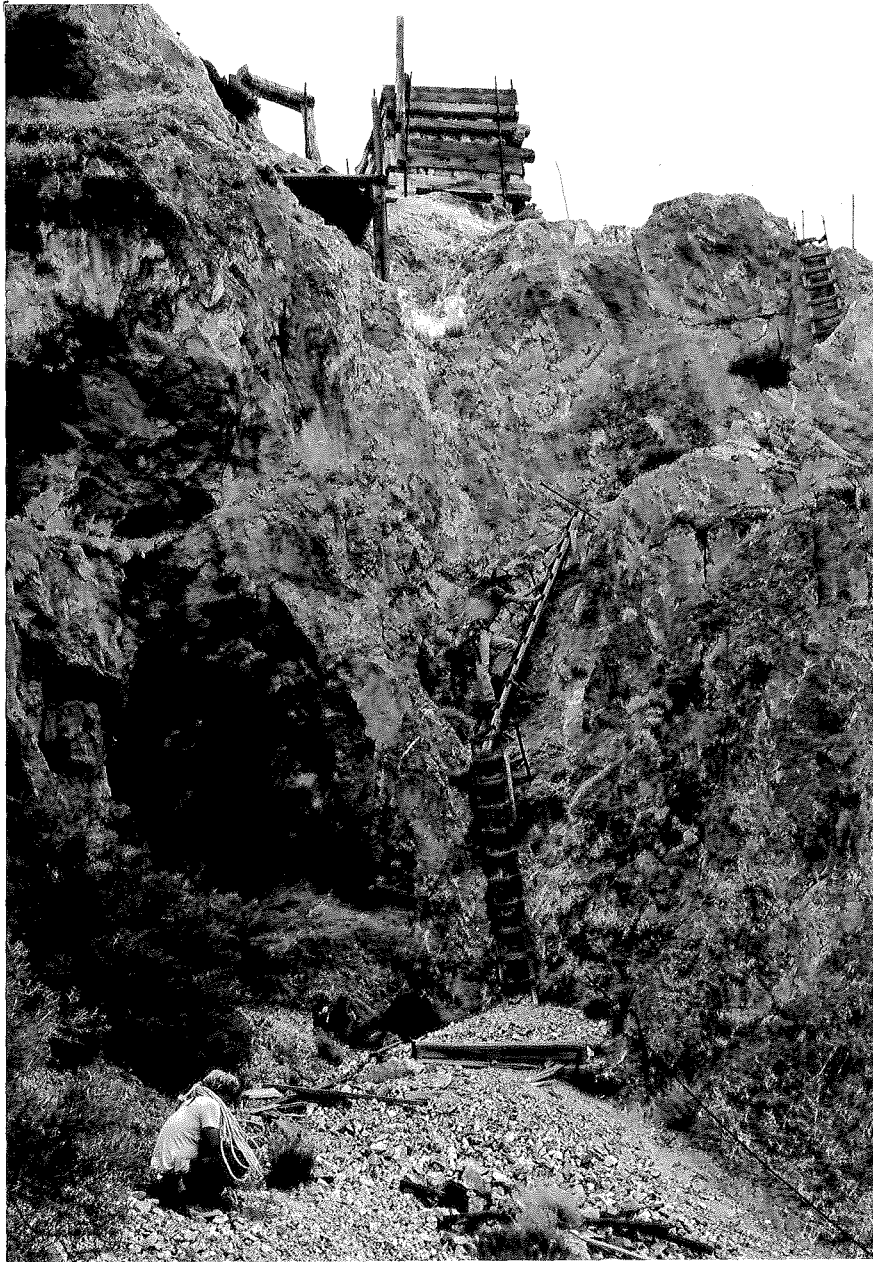


Figure 3.--Photograph of Bureau geologists approaching a tungsten mine near the Tungsten Queen Mine, showing typical terrain of the Tungsten Queen Mine and vein.

reach the vein. Scheelite was not detected inside this adit under ultraviolet light.

Silver was detected in 5 samples (table 1). The highest silver assay was 0.4 oz/ton (sample 5).

Identified Resources

A minimum indicated resource of 75,000 tons of material containing 0.3 percent WO_3 was identified in the Tungsten Queen Vein inside the Highland Ridge Roadless Area. This estimate is based upon assay results, and a strike length of 500 ft (the western 100 ft was horsetailed and not included in the calculations), an assumed dip length of 500 ft, and an average vein thickness of 3.6 ft. Resources for an eastward extension beyond the sampled vein were not calculated, even though the probability for an eastward extension is good. One or more major ore shoots may be present in the vein at depth, similar to the ore shoots mined at the Tungsten Queen Mine and elsewhere in the district. The dip length of the vein may be more than 500 ft; all other major tungsten-bearing veins in the district have good continuity along the strike and dip of the vein. The concentration of tungsten throughout the vein at depth probably varies from that at the surface. To more accurately determine the occurrence of tungsten at depth, drilling would be needed.

CONCLUSION

The Tungsten Queen vein crops out in the Highland Ridge Roadless Area for approximately 600 ft at the surface. This part of the vein contains an indicated resource of 75,000 tons of material averaging 0.3 percent WO_3 , with a minor amount of silver. At the current price of WO_3 (81.75 per short ton unit or \$24.52 per ton of ore, Feb., 1985), the in-place value of this resource is worth approximately 1.8 million dollars. Small veins of

this nature containing 0.3 percent WO_3 are not presently economical to mine by underground methods. For the value of material mined to approach mining and milling costs, this type of vein would need to contain over 1 percent WO_3 .

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