

COPPER KING PROJECT REPORT

Pershing and Churchill Counties, Nevada
Progress Report for June 16, 1979-February 4, 1980

INTRODUCTION

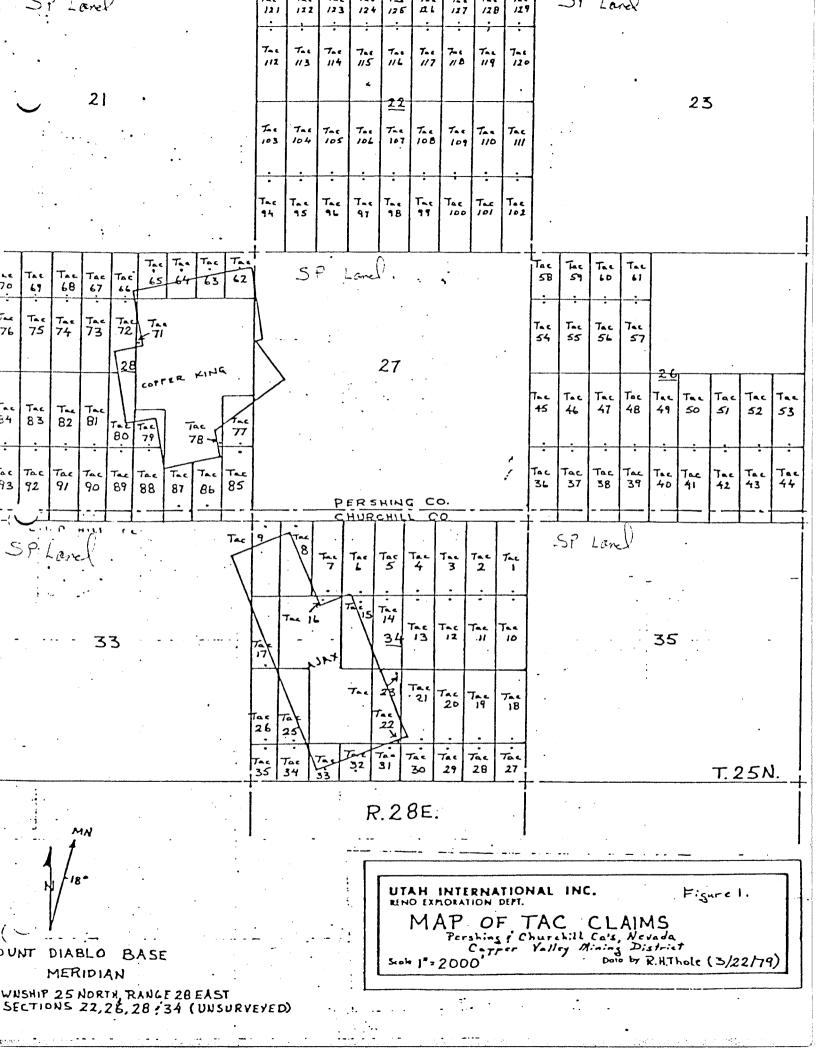
The purpose of this report is to review and to summarize the work completed to date and in particular the work that has been completed since June 16, 1979. The geologic ore potential has been recalculated for the Copper King deposit using all the available drill-hole information. Conclusions are drawn from recent geologic investigations and a recommendation is made to test the down-dip extension of the Copper King deposit with one deep drill-hole. In reading this report the reader is referred to the Copper King Project Progress Report for February, 1979, to June, 1979, for detailed maps and cross-sections.

LAND STATUS

The Copper King claim group contains 11 patented claims with an area of 184.5 acres situated in Sections 27 and 28, Township 25 North, Range 28 East, M.D.B. and M: (unsurveyed) Pershing County, Nevada, Figure 1.

The Ajax claim group contains 8 unpatented lode mining claims with an approximate area of 160 acres situated in Section 34, Township 25 North, Range 28 East, M.D.B. and M., Desert Peak (15 minute) quadrangle, Churchill County, Nevada. The Ajax, Ajax #1, Ajax #2 and Ajax #3 claims were recorded by E. J. Bottomley with the Churchill County Recorder in · 1960. In late 1975 the General Electric Company acquired these claims under a mining lease and option to purchase agreement from Mrs. Bottomley and also staked and recorded the Ajax #5, Ajax #6, Ajax #7 and Ajax #8 claims. Utah has a payment of \$16,000.00 due on or before June 1, 1980, on the lease option of the Copper King patented claims and \$8,000.00 on the lease option of the Ajax lode claims. If Utah intends to drop these claims, our written intention to do so must be made known one month prior to June 1, 1980. On March 22, 1979, Utah International Inc. recorded 128 Tac claims that partially surround the Copper King and Ajax claims, Figure 1. These claims were previously recorded as Chill claims and were located in August of 1976 by Douglas F. Sterck of Rocky Mountain Surveyors, Albuquerque, New Mexico, for Transcontinental Oil Company of Denver, Colorado. The affidavits of labor for assessment work for 1977 were filed on October 11, 1977, in Lovelock, Pershing County, and Fallon, Churchill County; however, no affidavits for 1978 assessment work were filed by Transcontinental Oil and the claims were allowed to become invalid.

Utah has mapped the Tac claims at a l"=1,000' scale and explored the area with magnetics and gravity without significant results. The work done on these claims will satisfy the assessment work obligation through September, 1981.



EXPLORATION, MINING AND PRODUCTION HISTORY

The following summarizes the more important exploration, mining and production history of the Copper King-Ajax group of claims:

- 1. The Copper King claims were originally staked from 1906 to 1908 by L. A. Friedman and Jesse Knight. However, recent recorded mining history at Copper King began in 1944 at which time U.S. Vanadium Corp. did some work at Copper King but soon abandoned the project as being too low grade.
- 2. E. J. Bottomley, in 1960, was aware of the exploration effort conducted by U.S. Vanadium and through his wife, Pershing County Deputy Assessor, acquired the Copper King patented claim group via a tax sale in 1947.
- 3. In 1950, hostilities in Korea stimulated demand for tungsten and resulted in a U.S. Government tungsten purchase program during 1951 at the fixed price of \$65 per short ton unit. At this time, Cordero Mining Company, a subsidiary of Sun Oil Company, obtained a lease and option from Bottomley and mined and milled a reported 750 tons of 0.82% WO₃ from the open pit adjacent to the Copper King incline shaft. The resulting concentrate which contained 614 units tungsten was sold on May 20, 1952, to the General Services Administration.
- 4. Cordero Mining Company was followed by Wallace and Durbin, who made a number of small shipments aggregating 193 tons of 0.22% WO₃ (circa 42.5 units) to the Walfrom Company mill at Toulon in 1956.
- 5. Following termination of the Government purchase program in December, 1956, the price for tungsten plummeted and Copper King sat idle until early 1960 at which time stripping activity was conducted but no production.
- 6. In 1968, Cline Tedrow examined the Copper King deposit for a group of promoters known as the Nevada Copper and Tungsten, Inc. The company leased the Copper King claim, contracted for an aerial survey, a topographic mapping job, and drilled four holes on the property. No geologic work was done, however, the holes were placed to intersect the copper-stained tactite and did intersect significant tungsten zones. Nevada Copper and Tungsten, Inc., ran out of money before finishing the fourth hole and later dropped their lease on the claims.
- 7. In early 1975, Bottomley submitted the Copper King-Ajax claim package to General Electric Company. Joe Tingley made a preliminary examination of the area and submitted a report on February 13, 1975, recommending that the Copper King and Ajax properties

be acquired mainly because he believed that the Copper King area had a potential of a mineable orebody in the 100,000 unit to 200,000 unit range and based on its proximity to the Springer Project, about 75 miles to the south of Springer. Joe Tingley also concluded that similar geology and correspondingly similar exploration potential existed at the nearby Ajax prospect. Consequently, on June 1, 1976, General Electric Co. entered into a mining lease and option to purchase agreement with the owners.

- In 1976, Chuck Seel conducted preliminary surface geologic mapping on a 1"=100' scale of one square mile, he examined all Copper King and Ajax tactite outcrops under ultraviolet light and took rock chip samples of areas exhibiting scheelite mineralization. Four diamond drill-holes, totaling 1,765 feet, were drilled to test the Copper King mineralization. In March, 1977, Seel completed a comprehensive report on the Copper King area in which he states that "six oreshoots are indicated with a total possible estimate of 65,000 tons of 0.568% WO3 (circa 37,000 units)". He recommended that if "a small surface mining operation at present favorable price for tungsten is not entirely satisfactory it would be most difficult to recommend more exploration at Copper King". Seel pointed out the poor potential for the development of either a large tonnage low-grade deposit or a smaller tonnage, high-grade deposit at Ajax and recommended no further work at the property.
- 9. On December 21, 1978, Mr. B. Perkins, a private consultant, was retained by Utah International to supervise the drilling of a 1,400 foot hole to test the down-dip extension of the Copper King deposit. Two zones of significant mineralization were intersected, however, because of a lack of funds the drilling was terminated at 735 feet. Perkins was impressed by the amount of alteration, tactite and sulfides shown in the drill-hole and indicated that the area was a good exploration target for porphyry-type copper minerallization.
- 10. Following Perkins recommendation, Thole recorded 128 Tac claims on March 22, 1979. In addition, Thole mapped 5 square miles at a scale of 1"=1,000' on the west flank of the Trinity Range. The detailed geology of the Copper King-Ajax areas was mapped at a 1"=100' scale and 140 rock chip samples were collected and submitted for 840 geochemical determinations. During this time Barney O'Toole supervised detailed and regional IP, resistivity, magnetic and gravity surveys over the Copper King-Ajax area.
- 11. In June, 1979, Thole presented a summary report in which he calculated from previous drill-hole information that the Copper King deposit may contain a maximum of 500,000 tons of 0.4%

WO3 (circa 200,000 units). He recommended a drilling program, totaling 4,500 feet, to test for extensions of the Copper King deposit, in particular a western extension beneath alluvial cover, and to test the deposits down-dip potential. In addition, it was recommended to test the Ajax mineralization by drilling. Thole concluded that the area has a poor porphyry copper potential.

GEOCHEMISTRY

Very little geochemistry was done since the completion of the June, 1979 Progress Report; however, several minor studies were conducted. Barney O'Toole sent several samples of hornfels rock to the Zonge Engineering and Research Organization to substantiate the source of a large IP response in the Copper King area. Zonge Engineering found that one of the samples gave a high frequency response typical of fine-grained sulfides and suggested that this rock was a likely source of the IP response measured in the field. A petrographic study of the rock sample is given below:

CK-1

Opaques	10-15%
Quartz	80%
Sericite	5%
Malachite	<1%

Zonge Engineering stated that "the opaques occur in irregular patches and in very fine-grained disseminated form. Less than 1% of the opaques occur as iron-stained cubes, and are probably pyrite. About 3% of the opaques in both the patches and disseminated particles are a metallic silver yellow and may be pyrite or pyrrhotite. The remaining opaques in both patches and disseminated form are metallic grey; their association with the malachite flecks suggests that they are copper sulfides, perhaps tetrahedrite."

I collected a number of samples for geochemical analysis from the area giving the IP response, and although some samples were weakly to moderately anomalous in Ag, Mo and Zn, no significant copper anomaly was indicated. I have not seen the polished thin-section, however, I believe that what was seen is most likely oxidized and fresh pyrite or pyrrhotite and possibly primary hematite. From detailed mapping I believe that the anomalous Ag, Mo and Zn are probably associated with the fine-grained disseminated sulfides and that they are a primary constituent of the rock being syngenetic in origin.

Eight rock chip samples were sent to the Sunnyvale Lab for Sn analysis and one sample collected from a pegmatite recorded 70 ppm Sn. Although this sample is anomalous it is not ore grade and values this high are somewhat common in pegmatite deposits.

Eighteen samples representing about 180 feet of split CK-10 core were sent to the Sunnyvale Lab for analysis of Cu, Ag, WO₃, Mo, Pb and Zn. No significant mineralization was recorded.

DRILLING RESULTS

The results of all drilling activities completed at Copper King since 1969 are summarized in Table 1 and the intercepts of ${\rm WO}_3$ of potential mineable thickness and grade are marked by an asterisk.

Six of the ten holes drilled at Copper King contain what may be considered ore intercepts (i.e., +6 foot true thickness of $\geq 0.35\%$ WO3). Drill-hole CK-2 contains five intercepts of $\geq 0.2\%$ WO3, however, the true thickness of each of the five zones does not exceed 2.5 feet. Both CK-3 and CK-9 were in tactite that was potentially tungstenbearing when the holes were terminated at 935 feet and 735 feet, respectively. In CK-3, five zones of significant tungsten mineralization were intersected between 805 feet and 921 feet. There is, therefore, a strong possibility that a potential ore zone or zones extends for some distance beneath 935 feet.

Recently, drill-hole CK-10 was located to test the possible westward extension of the Copper King deposit beneath alluvial cover. This possibility was indicated by the delineation of an arcuate magnetic low extending both eastwards and westwards from the area previously drilled at the Copper King mine suggesting a fair possibility that the scheelite-bearing tactite may also extend in these directions.

The first 180 feet of drill-hole CK-10 passed through alluvial stream gravels at which depth granodiorite bedrock was intersected, Fig. 2. A number of thin latite and basalt dikes that cut across the fresh biotite granodiorite were intersected from about 385 feet to 703 feet. Pyrite-bearing calc-silicate with about 0.05% estimated WO₃ was intersected at 574 feet to 589½ feet. This calc-silicate may coorelate with the tactite zone seen in outcrop 200 feet to the east. In addition, strongly foliated granodiorite with veins containing calcite, chlorite, pyrite and traces of chalcopyrite and molybdenite were intersected between 703 feet and 711 feet with about 0.05% estimated contained WO₃. Although it is believed that the zone seen in outcrop was intersected in CK-10, the borehole intersection did not contain ore-grade mineralization.

The magnetic susceptibility of the core recovered from CK-10 was measured at a 5 foot interval to compare the results with the westward trending anomalous magnetic low delineated by Barney O'Toole. It was found that from 180 feet to 380 feet the magnetic susceptibility of the granodiorite averaged between 0.2×10^{-3} cgs and 0.5×10^{-3} cgs. Between 380 feet and 540 feet the magnetic susceptibility was 0 and in the vicinity of the calc-silicate between 540 feet and 600 feet it was about 0.1×10^{-3} cgs. From 600 feet to the end of CK-10 the magnetic susceptibility of the granodiorite increased to 0.38×10^{-3} cgs. Although the basalt dikes occurring between 420 feet and 703 feet exhibit a high magnetic susceptibility of 1.8×10^{-3} cgs, they are about 10 feet or less in thickness and it is thought that their influence on the overall magnetic properties of the section is minimal.

The drilling results indicate that both the westward extension of the Copper King tactite exposure and the anomalous magnetic low were tested without intersecting economic WO_3 . In addition, the drilling indicated a strong possibility that the Copper King deposit is terminated by granodiorite to the west.

GEOLOGIC ORE POTENTIAL

In the February-June 1979 Progress Report, a geologic ore potential was calculated for the Copper King deposit assuming that in the area that was drilled at least one scheelite zone is continuous along a strike length of 1,000 feet, and to a 1,000 foot depth with an average grade of 0.4% WO3, a 6 foot average thickness and 12 ft. 3/ton. Under these conditions this deposit may contain up to 500,000 tons of ore, or about 200,000 stu. These figures could conceivably be increased because the drilling results indicate the presence of as many as five parallel zones of scheelite mineralization in the tactite lens, any one of which could thicken or increase in grade over a short distance. In addition, the down-dip potential is open and further drilling may increase the total reserves as much as 50,000 tons (circa 20,000 stu) for every additional 100 foot interval of proven mineralization down-dip. However, the true thickness of the deeper mineralization has never been tested and this must be done before an accurate ore reserve calculation can be made. In Table 2, a hypothetical model has been constructed, assuming that at least two zones of mineable scheelite mineralization (i.e., 0.15% grade cut-off and minimum 4 foot thickness) are present in the area outlined by drilling. A geologic ore potential is calculated for the two zones assuming that each zone is of mineable grade and thickness over 100%, 80%, 60%, and 40% of the area occupies by the potentially ore-bearing unit. If 100% of the potentially mineralized area is ore-bearing the deposit would contain 625,000 tons (circa 237,500 stu), however, if only 40% of the area is ore-bearing it would contain 250,000 tons

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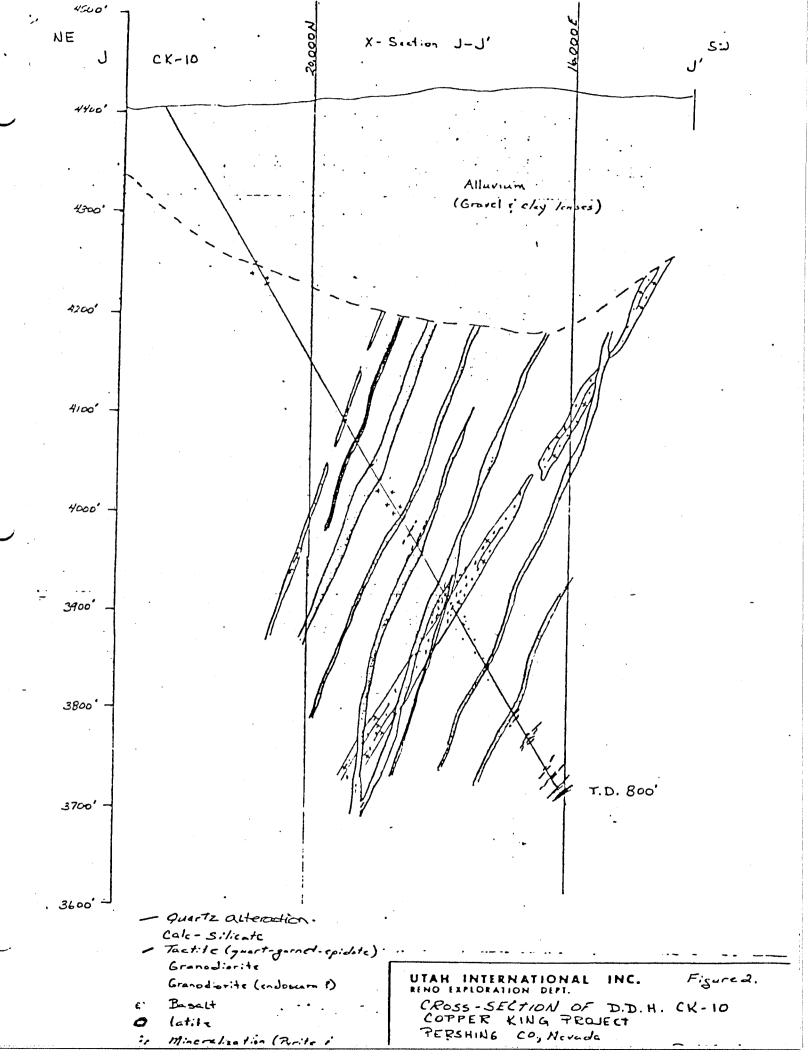
TABLE 1. SUMMARY OF COPPER KING DIAMOND DRILL-HOLE DATA
(Cross-sections illustrating this data are presented in the Copper King Project
Progress Report for February 1, 1979-June 15, 1979)

Number	Coord North	linates East	Inclination	Total Depth (feet)	Interval Sampled	Nole Thickness	True Thickness Estimated	wo _{3 &}
CK-1	20,108	16,545	Vert.	279	* 64-78'	14'		
				•	83-84	1'	6' 0.4'	0.69
CK-2	30 005	36 207				. -	0.4	3.19
CK-2	20,095	16,327	Vert.	432	15-20'	5'	2.5'	0.16
					45-50'	5'	2.5'	0.10
					262-267	5'	2.5'	0.21
					277-282	5'	2.5'	0.14
					297-302'	5'	2.5'	0.25
					312-317'	5'	2.5'	0.22
					323-3251	2'	1'	0.34
CK-3	20,221	16,598	Vert.	935	202-203'			
				233	*300-325'	1'	0.6'	0.31
					331-338'	25'	16'	0.38
					805-810	7'	51	0.14
					810-815	5'	3.2'	1.20
					860-865'	5 '	3.2'	0.12
					*870-875'	5'	3.2'	0.10
					895-898	5'	3.2'	0.61
				•	919-921'	3'	2'	0.51
 .					313-321	2'	1.3'	0.11
CK-4	20,267	16,790	Vert.	538	-	Non	ne	
CK-5	20,202	16,228	-70°	453		•	· · · · · · · · · · · · · · · · · · ·	
	•	20,220	- 70°	451	104-105'	1'	0.71'	0.20
				•	*277-285	81	7'	0.35
					*313.5-322	8.5	6.71	0.22
CK-6	19,978	16,293	-60°	463	10-12'	2.		
				.03	216-224'	2'	0.85'	0.13
					226-228'	8'	6'	0.02
					249-251'	2'	1.5'	0.03
					743-72T	2'	1.5'	0.04

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TABLE 1. SUMMARY OF COPPER KING DIAMOND DRILL-HOLE DATA - Continued (Cross-sections illustrating this data are presented in the Copper King Project Progress Report for February 1, 1979-June 15, 1979)

DDH Number	Coord North	inates East	Inclination	Total depth (feet)	Interval Sampled	Hole Thickness	True Thickness Estimated	WO3&
CK-7	20,387	16,444	-600	340	195-199' * <u>199-202'</u> * <u>202-215'</u> 215-220'	4' 3' 13' 5'	2.8' 2.1' 10.7' 4.1'	0.04 0.25 0.86
CK-8	20,387	14,444	-75 ⁰	545	242.5-243.5' 283-285' *375-387'	1' 2' 12'	1' 1.3' 9'	0.10 11.10 0.3 0.42
CK-9	20,170	17,100	-70 ⁰	735	*643-654.5' 667.5-668.5'	11.5' 1'	8.5' 0.8'	1.46
CK-10	20,086	15,200	-60°	800		Non		5.40



(circa 95,000 stu). With the data presently available it probably can be assumed that at least 60% of the area will be of mineable thickness and grade and that the Copper King deposit represents a geologic potential of 375,000 tons at 0.38% WO₃ (circa 142,500 units).

TABLE 2. STATISTICAL ANALYSIS OF COPPER KING

GEOLOGIC ORE POTENTIAL

(Assuming 0.15% grade cut-off and minimum 4' thickness)

Scheelite Lens No.	<u>Length</u>	Depth	Average Thickness	Percent of Area Mineralized	Percent WO3 Average Grade	Tons	Units (stu)
1	1,000'	1,000'	6 '	100	0.4	500,000	200,000
1	1,000'	1,000'	6 '	80	0.4	400,000	160,000
1	1,000'	1,000'	6 '	60	0.4	300,000	120,000
1	1,000'	1,000'	6 '	40	0.4	200,000	80,000
2	500 '	500 '	6 '	100	0.3	125,000	37,500
2	500 '	500 '	6 '	80	0.3	100,000	30,000
2	500	500 '	6 '	60	0.3	75,000	22,500
2	500'	500 '	6'	40	0.3	50,000	15,000
1 + 2				100	0.38	625,000	237,500
1 + 2				80	0.38	500,000	190,000
1 + 2				60	0.38	375,000	142,500
1 + 2				40	0.38	250,000	95,000

CONCLUSIONS

Recent drilling results of CK-10 indicate that both the westward extension of the Copper King tactite exposure and the anomalous magnetic low were tested without intersecting economic WO3. The occurrence of granodiorite outcrops to the north and east of CK-10 and the thick sequence of granodiorite intersected indicate a strong possibility that the Copper King deposit is terminated by granodiorite to the west. The anomalous magnetic low recorded by geophysics is probably explained by the thick sequence of granodiorite exhibiting extremely low magnetic susceptibility. Some of this rock contains carbonate veinlets and a 15 foot thick limestone lens. Possibly carbonatization of the granodiorite may have played some part in reducing the overall magnetic susceptibility of the granodiorite.

Drill-hole information indicates that the Copper King zone of scheelite-bearing lenses is somewhat prismatic in form with its main axis oriented almost vertical, extending for about 1,000 feet along strike and to a depth in excess of 1,000 feet. Assuming that at least 60% of this area will be of mineable thickness (about 6 foot) and grade, the Copper King deposit probably represents a geologic potential reserve of at least 375,000 tons at 0.38% WO₃ (circa 142,500 units). The down-dip potential is open and further drilling beyond the 1,000 foot depth may increase the total potential to as much as 50,000 tons (circa 20,000 stu) for every additional 100 foot interval of proven mineralization.

RECOMMENDATIONS

The potential strike length of the Copper King deposit has been grossly determined by geologic mapping and by drilling: however, the true thickness and extent of the deeper mineralization has never been tested and this must be done before an accurate ore reserve calculation is made. is probably a good possibility that the Copper King deposit contains about 375,000 tons of WO₃ (circa 142,500 units) distributed at a thickness (6') and grade (0.38% WO₃) that is amenable to underground mining methods. Even if this potential is doubled by successful exploration down-dip, the total would be increased to 280,000 stu, far short of the 1 million stu target figure thought to be economic to mine. Because of the complex form of the Copper King deposit the methods of underground mining will be correspondingly complex and costly. If a small, costly mining operation at Copper King seems feasible in the production of from 140,000 to 280,000 stu, I recommend that Utah drill CK-ll, Figure 3, at a -60° inclination and 1,500 foot depth to intersect the projection of the central near vertical axis of the Copper King deposit. This drill-hole would not only test the down-dip potential of the deposit by intersecting the tactite about 200 feet below any previous intersection but by intersecting the ore-bearing unit at about a 50° to 80° angle it would delineate the number and thickness of scheelite-bearing zones. If the results of this drillhole prove discouraging the Copper King deposit would be delineated on all sides and the claims could be dropped without further work. However, if significant mineralization were intersected the ore potential would be substantially increased from 140,000 units and additional drilling would be warranted. In addition, if an economic ore deposit is outlined at Copper King, additional reserves conceivably may be delineated on the Ajax claims which have never been tested by drilling.

If a decision is made to drill CK-ll, this drilling should be completed and assessed before May 1, 1980, the date Utah is bound to notify the owners of its intention to drop the claims or forfeit the \$24,000.00 due on the lease options for the Copper King and Ajax claims.

R. S. Chole

REFERENCES

Seel, C., 1977, Copper King-Ajax Prospects, Pershing-Churchill Counties, Nevada - a Progress Report.

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