File	No.	C-42
	110	- / A

PROSPECT CARDS	
	Code No.
Property Name Cowboy Mine	Followup Recom.
Property Owner	Later Review Recom.
Submitted by	Examined by
Location: State Ovegor	Company
County Josephine	Date
Mining D. Walds	Where filed
T 4/S R PW Sec. ""	
Metals Cu Mo Pb Zn Ag Au Fe Mn Cr Ni W U Re P205 K20 Sn Be Coal Hg Other	AMS Quad Other Quad Production None 102 103 104 105 505 106 TONS Geology Host Rock Mineralization Type Massia b.dier Trend Ore Chy, py, cobeltite, pyrr, sphale Gangue Alteration Type Extent Bibliography USGS USBM Other Sheron 1737
Field Time long restrictions	Minus in this dist mod a escent look before any money is spent apporation but the one bodies are used as due to the mession acis of the mineralogy

COWBOY MINE (copper)

Waldo area

"LOCATION AND DEVELOPMENT: The Cowboy Mine is in the NE sec. 11, T. 44 S., R. 8 W., 3 miles by road southeast of Takilma, at an altitude of about 2600 feet on a steep slope overlooking Page Creek. A serviceable road has been built as far as the lower tunnel, but ore from the upper and principal workings must be hauled on sleds for about an eighth of a mile over a rough course.

"The orebody is developed through tunnels and by various raises, stopes, and winzes. About 2000 feet of tunnels have been driven--350 feet on the upper level, 200 feet on the intermediate level, 500 feet on level 2, about 100 feet at the East Cowboy, and, largely during 1930, 850 feet on the lower (No. 3) tunnel. Tunnel 3 was driven with the hope of intersecting the west orebody 200 feet below the present stopes, but at the time of the writer's visit, in August, 1930, it had not reached its objective.

"HISTORY AND PRODUCTION: According to E. H. Messenger, the superintendent, a Mr. Strong discovered ore on what is now known as the East Cowboy about 1900 and excavated ore from an open pit. However, little work was done prior to 1903, when C. L. Tutt and associates, of Colorado Springs, Colo., purchased the property. The Queen of Bronze Mining Co., the present owner, acquired the mine in 1916 and, although the property has been leased at various times, has mined most of the ore produced. From 1916 to 1919 a total of 842 tons of ore was mined, and it is reported that ore was treated at the Queen of Bronze smelter between 1906 and 1910. However, most of the production is credited to the period from 1928 to 1930, when 75 cars were shipped. Mr. Messenger estimates a total production of about 100 cars, or roughly, 5000 tons. The value of the production is estimated at \$300,000.

"GEOLOGY: The orebodies at the Cowboy Mine are found near the contact of greenstone and serpentine. The prevailing greenstones in the vicinity of the orebodies are even-grained and fragmental varieties of metabasalt and medium-grained metagabbro. A highly altered greenish rock with large white phenocrysts, tentatively classed as metadiorite, has recently been exposed in the lower tunnel. Numerous masses of greenstone are included in the serpentine near the contact, and many of them have been found underground. The serpentine is normally dark green and, in general, has a high luster. Near the orebodies, however, it contains much calcite and has a stony appearance resembling that of the altered greenstones.

"The ore occurs along a fault zone in serpentine as a series of slightly curved lenslike bodies separated and surrounded by dark grayish-green gougy material consisting principally of fine-grained, felted antigorite (serpentine). The fault zone, in places from 6 to 8 feet wide, extends to the north and south beyond the ore limits. The lenses of ore are composed of rounded lumps of massive sulphide minerals or serpentine lumps with sulphide stringers, but, although the ore as mined resembles blocks of serpentine, it is easily distinguished by its greater weight. In general, the ore lenses strike north and dip 45°-65° E. The angle of dip has increased with depth. The maximum length of the series of ore lenses is about 170 feet, and the thickness ranges from that of thin stringers to 7 or 8 feet. Oxidation and enrichment have occurred to a noteworthy extent only near the surface. An increase in copper content in the ore mined from the open pit was undoubtedly caused by sulphide enrichment, but the process has not added materially to the copper content below a depth of 50 feet.

"MINERALOGY: The abundant hypogene sulphides are cobaltite, chalcopyrite,

cubanite, sphalerite, and pyrrhotite. Chalcocite occurs as a supergene sulphide, and malachite, cuprite, tenorite, hematite, and limonite are the more common oxidation products. In order of abundance the gangue minerals are serpentine, calcite, quartz, and epidote. With the exception of serpentine the gangue minerals are not readily visible in hand specimens, although post-sulphide calcite is in some places evident along fracture surfaces. The microscope shows, however, that calcite constitutes a considerable part of the ore and of the wall rocks next to the ore.

"The cobaltite resembles pyrite in hardness and crystal outline but differs from it in color. Although microchemical tests reveal considerable iron in the cobaltite, the crystal form and lack of anisotropism distinguish it from glaucodot (a cobalt-iron-arsenic sulphide). Cubanite and chalcopyrite differ considerably in color and degree of anisotropism. Pyrrhotite resembles cubanite but is readily distinguished from it in polished sections by a greater relief. Sphalerite is fairly abundant and is readily distinguished by its gray color. In addition, it almost everywhere contains oriented blebs of chalcopyrite or pyrrhotite.

"The succession in the deposition of the sulphide minerals is the normal one as defined by Lindgren despite the fact that repetition occurs. There appears, however, to be a reversal in the succession of the gangue minerals. According to Lindgren the normal order of mineral deposition in deposits of this general class is silicates, quartz, carbonates and other gangue minerals, cobaltite, pyrrhotite, sphalerite, and chalcopyrite. The order of formation as actually determined is serpentine, calcite, epidote, quartz, cobaltite, sphalerite, chalcopyrite and cubanite, pyrrhotite, sphalerite, and calcite. The succession was thrice interrupted by fracturing--once after the deposition of the gangue minerals, again after the formation of the cobaltite, and again after the deposition of the sulphides but before the deposition of the later calcite. Serpentine was formed before the deposition of the older calcite, because veinlets of this calcite clearly cut felted plates of the serpentine, thus illustrating that serpentinization had taken place, in part at least, before the deposition of the ore. Epidote appears to have formed after the older calcite, possibly in part from the reaction of hydrothermal solutions upon it. Quartz veinlets clearly cut the epidote, and veinlets of sulphides, in turn, cut all three of these gangue minerals. The sulphides have replaced calcite more readily than the other gangue minerals, and in most places this differential replacement of calcite is very noticeable. Cobaltite was the first sulphide mineral deposited. A period of fracturing followed, and then later sulphides were introduced, for the most part along the fractures. Sphalerite is the first sulphide known to have formed after the cobaltite. If other sulphides preceded the sphalerite the evidence of them in the ores studied has been completely destroyed. Chalcopyrite and cubanite formed after the sphalerite and, where associated, they occur as bladelike intergrowths. Of the two, chalcopyrite is considerably more abundant. Pyrrhotite succeeded the cubanite and chalcopyrite. It occurs as irregular masses, as veinlets in or along grains of older minerals, as lentils in chalcopyrite and cubanite, and as oriented blebs and laths in sphalerite. The blebs and laths were certainly formed by replacement along cleavage directions in the sphalerite, as they occur only where sphalerite is known to be replaced by pyrrhotite. At other places oriented blebs of chalcopyrite are numerous, but blebs and laths of pyrrhotite are missing. Lentils of pyrrhotite cut intergrowths of cubanite and chalcopyrite at various angles and in some places are parallel to the intergrowths. Some of the lentils merge into irregular-shaped masses, others terminate at grain boundaries, and still others appear isolated within grains

of cubanite and chalcopyrite. Veinlets of pyrrhotite cut chalcopyrite and are numerous along grain boundaries of sphalerite and of cubanite and chalcopyrite. Some veinlets clearly cut across twinned crystals of chalcopyrite. The more massive bodies of pyrrhotite replace cobaltite, chalcopyrite, and sphalerite, whereas the pyrrhotite in turn is replaced by a later generation of sphalerite. This sphalerite, the last of the sulphides to form, replaces both chalcopyrite and pyrrhotite, and veinlets and masses of it transverse the boundaries of these two minerals. Fracturing followed the deposition of the later sphalerite, and at some time later calcite was introduced along the fractures.

"The proportions of the different sulphides vary greatly from place to place. In general, the shipping ore is said to average about 14 percent of copper, \$1 in gold to the ton, considerable zinc, and a little silver. A sample reported by G. E. Stowell, mining engineer, as taken'in the Rose stope across a lens measuring 3 feet by 10 feet'assayed 15.1 percent copper and 0.08 ounce of gold and 8 ounces of silver to the ton. No analyses are known to have been made of the run-of-mine ore for cobalt, nickel, zinc, arsenic, or the platinum group. A partial analysis of one of the 'boulders' containing little or no visible cobaltite, made by E. T. Erickson in the chemical laboratory of the United States Geological Survey, showed copper 18.65 percent, zinc 0.24 percent, cobalt 0.15 percent, arsenic 0.11 percent, nickel 0.11 percent, and chromium 0.04 percent. Tests were made of metals of the platinum group (osmium, ruthenium, iridium, rhodium, palladium, and platinum), but they were not found even in small amounts (less than 0.01 to 0.02 ounce to the ton).

"ORIGIN OF THE ORE: The ore bodies at the Cowboy Mine resemble the 'boulder' deposits in serpentine, described by Hershey in northern California and by Butler and Mitchell in Curry County, southwestern Oregon, but differ from some of them in mineral constitution. Some of the deposits described by Hershey and by Butler and Mitchell contain magnetite and chalcocite as the principal metallic minerals and bornite, native copper, chromite, and oxidation products in smaller amounts. Other deposits described by Butler and Mitchell contain chalcopyrite and pyrrhotite as the principal ore minerals and, as described, appear to resemble the Cowboy deposit very closely. In all the deposits described by Hershey and by Butler and Mitchell little or no quartz or calcite is reported. Butler and Mitchell apparently believe that the ore minerals in the 'boulder' deposits described by them were originally distributed throughout the igneous rocks but have been segregated in the positions now found during the changes accompanying the serpentinization of the containing rocks. For the deposits in northern California Hershey says:

"'Perhaps the molten rock came into contact with and absorbed rocks containing ordinary copper deposits, thus deriving an unusual copper constituent which was widely disseminated in certain portions of the peridotite and related basic rocks but during serpentinization became segrated with the iron minerals. However, it remains an open question as to whether the segregation was connected with the solidification of the magmas or with the subsequent serpentinization.

"The presence of cobaltite, pyrrhotite, and chalcopyrite in a basic igneous rock and the apparent scarcity of quartz, calcite, or other gangue minerals characteristic of veins is at once suggestive of a deposit formed by magmatic segregation. The mineral association undoubtedly indicates that the ore was formed at high temperatures and at considerable depth, but the fact that the sulphides have been introduced into calcite, epidote, and quartz, which, as shown by the microscope, are abundant, points to another mode of origin—that is, to a hydrothermal deposit originating under conditions of high temperature and at considerable depth but in and along fractures. According to Schwartz

the presence of chalcopyrite and cubanite intergrowths indicates a temperature of formation above 400° C. and probably above 450° C.

"The mineral assemblage in the Cowboy ore, in the light of present knowledge, points quite definitely to a deep-seated origin. The source of the ore minerals, however, can only be surmised. Granitic rocks have been intruded into the serpentine in areas closely adjacent to Takilma and no doubt are not far beneath the surface in the Takilma vicinity, although none were found at the surface. These later granitic rocks are believed by most investigators to be the source of many ore deposits in southwestern Oregon, particularly of the gold-quartz veins. However, the occurrence of copper deposits in very close association with serpentine, or in greenstone at or close to serpentine contacts, is so general that Diller felt that the serpentine had much to do in producing the ore deposits, although he points out that the serpentine itself rarely contains bodies of ore except copper.

"The shape of the original ore bodies is not easily interpreted. Tiny sulphide stringers and disseminations are found in the wall rocks next to the more massive sulphide ore, and stringers usually extend for some distance beyond the termination of the ore lenses. It is therefore believed that the original ore bodies were roughly lens-shaped but that the lens shape has been accentuated by postmineral movements. The strongest postmineral movements were probably an accompaniment of the general deformation of the region, although the processes attending serpentinization, which is essentially a hydration process producing a considerable increase in rock volume, may have contributed to the stresses causing the movements, at least locally. Movements resulting from stresses, whatever their origin, normally cause adjustments along numerous irregular fractures in serpentines, but where harder rocks are included in the serpentine the adjustments would tend to follow fractures passing around the more resistant bodies. Well-defined, slickensided fractures of this type can be observed in the Cowboy Mine next to the ore bodies and around greenstone inclusions. Attempts have been made to follow these fractures away from the ore bodies, particularly the well-defined hanging-wall fracture on the No. 2 and intermediate levels, but without success, owing to the fact that the fracture tends to lose its identity a short distance from the ore.

"The principal events in the genesis of the ore at the Cowboy Mine may be outlined as follows: After the peridotite rocks had become solid and while these rocks were deeply buried, fractures or lines of weekness developed parallel to the greenstone-peridotite contact. Ore-bearing solutions, derived either from the parent magma or from a younger intrusive body, in places forced their way along the fractures, or lines of weakness, and deposited gangue and ore minerals. Calcite appears to have been introduced first, followed by epidote, which may have developed partly by the reaction of the hot solutions with the introduced calcits. Quartz was next introduced. After the deposition of the quartz, stresses within the rocks caused fracturing, and the fractures controlled in a large measure the deposition of the sulphides that followed. Cobaltite was the first sulphide introduced. It was fractured, and the later sulphides were introduced along the fractures. Sphalerite was the first sulphide to form after the cobaltite. It was followed without interruption by chalcopyrite, cubanite, pyrrhotite, and sphalerite. The cubanite was probably deposited as a solid solution in chalcopyrite but separated out during cooling as bladelike intergrowths when the proper temperature was reached. The occurrence, late in the series, of pyrrhotite followed by sphalerite indicates a recurrence of higher temperature before the succession was completed. Fracturing followed the deposition of the sulphides, and the younger calcite

was introduced along the fractures. Eventually the deposits were exposed by erosion, which recently has kept pace fairly well with oxidation and enrichment, as there is very little evidence of either below a depth of 50 feet.

"ECONOMIC CONSIDERATIONS: At the Cowboy Mine, as at the Queen of Bronze," very little reserve ore is blocked out, owing in large measure to the nature of the deposit. Development and mining of necessity proceed simultaneously. because of the irregular outline of the ore bodies. In other words, it is necessary to mine the ore in order to delineate its outline. The present ore shoot has been followed downward on its dip for about 170 feet. Within this distance six major lenses were found, and it seems likely that with further prospecting downward others will be discovered. The ore body on level 2 is shorter horizontally than on the levels above, but there is no reason to suspect that the ore will end abruptly at this point. The feasibility of further prospecting down the dip, however, will depend largely upon the demand for copper. Thus far, prospecting has not revealed a series of lenses in horizontal alinement on level 2, despite the fact that the prospecting has been done along the fault in which the ore occurs. However, if the genesis of the deposit is correctly interpreted, there is no reason to believe that other ore lenses do not exist at the Cowboy Mine in the unexplored ground in the immediate vicinity of the proved ore. Recent work on the East Cowboy has disclosed oxidized copper ore of good grade, and this deposit appears worthy of further prospecting when the copper market justifies the expenditure.

"The mineralization at the Cowboy Mine is of the deep-zone type, and as exidation and enrichment have occurred only near the surface, the ore cannot be expected to differ greatly from that on level 2 for another several hundred feet, providing it should continue downward for that depth. Furthermore, the mineralogy and metal content of undiscovered ore bodies in the immediate vicinity, if they exist, should not differ greatly from those of the bodies already known."

The property has been worked in a small way, shipping "high grade" to the Tacoma smelter in more recent years. It is now affiliated with Queen of Bronze group.

(W. R. Burner, 2/28/40.)

References: Shenon, 33b:170 (quoted)
Parks & Swartley, 16:83.

VO. 4		
NO. 5	LOCATION DISCOVERY	NO. 2
NO. 6		NO. 7

Notice of Mining Location 418 81-05511

STATE OF OREGON,

County	County	of Josephine	
		Waldo	

DESCRIPTION OF CLAIM.		Waldo	
NOTICE HEREBY IS GIVEN one who has declared his intention to be place upon the unappropriated public doing District; and, in accordance with the of said Mining District, have located and tice of such discovery and location on a	ecome such, have domain of the United laws of the United and do hereby locate	iscovered a vein or lode I States within the State I States, of the State of a claim upon such vein	of mineral bearing rock in e of Oregon and said Min- Oregon and the regulations or lode by posting this no-
name of the claim is Takilm as follows:	na Belle		Claim, further described
Commencing at a post marked No	o. 1 (Discovery Pos	t), from thence	
50 feet in a	N 41° E	direction to an end	post marked No. 2, thence
150feet in a	S 49° E	direction to a corner	post marked No. 3, thence
1000 feet in a	S41°W	direction to a corner	post marked No. 4, thence
	N 49° W	direction to an end	post marked No. 5, thence
150feet in a	N 49° W	direction to a corner	post marked No. 6, thence
1000 feet in a	N 41° E	direction to a corner	post marked No. 7, thence
150 feet in a	S 49° E	direction to sai	id end post marked No 2.
The locators claim	50	feet in a	N 41° E
direction from point of discovery to the	north	end line and	950
feet in the opposite direction from point	of discovery to the	south	end line and
150 feet on each side of	the middle of said	vein or lode, further clai	ming all the surface rights,
privileges and minerals, with all dips, s	purs, angles and va	riations, and other right	ts granted by existing laws
and customs. This claim is further descri	ibed as being 1501	feet from a natural	object or permanent monu-
ment in the vicinity, to-wit:			
Corner No. 7 bears S 42°55' W,	1501 feet, fro	m Corner No. 3 of	the Morgan lode claim
(MS 522). Claim occupies the	southwesterly	portion of Gov't L	ot 2 of Section 11,
T41S, R8W, W.M.			

The general course or strike of the vein	or lode as nearly a	s may be determined is	N41° E - S41° W.

with reference to the netural object or permanent monuments described above. The adjoining claims are On the northeast, the Pride of Josephine (unpatented); on the northwest, the Cowboy and Oregon lodes (MS 416); on the southeast, the Copper King lode (MS 416); on the southwest, the Cowboy and Copper Queen lodes (MS 416).

This notice is placed at discovery post No. 1; posts are placed at each corner and both center ends, and the name of this vein or lode and date of location are placed on all posts so that the boundaries of the claim may be readily traced. In construing this location notice, the singular includes the plural and vice versa, where the context so requires.

Located this 3rd day of April

NO. 4		NO. 3
NO. 5	LOCATION DISCOVERYPOST NO. 1	NO
NO. 6		NO. 7

VOL 12 PAGE 420 81-05512 VOL IZ PAGE 4Z Notice of Mining Location

STATE OF OREGON.

Cou	County o	of	Josephi	ne	
			Waldo	Mining Distri	ic

NOTICE HEREBY IS GIVEN that the undersigned locators, each a citizen of the United States or one who has declared his intention to become such, have discovered a vein or lode of mineral bearing rock in place upon the unappropriated public domain of the United States within the State of Oregon and said Mining District; and, in accordance with the laws of the United States, of the State of Oregon and the regulations of said Mining District, have located and do hereby locate a claim upon such vein or lode by posting this notice of such discovery and location on a substantial post at the point of discovery, marked Post No. 1. The Pride of Josephine name of the claim is Claim, further described as follows: Commencing at a post marked No. 1 (Discovery Post), from thence feet in a S41° W direction to an end post marked No. 2, thence 50 150 feet in a N49° W direction to a corner post marked No. 3, thence 1500 feet in a N41° E direction to a corner post marked No. 4, thence feet in a S 49° E direction to an end post marked No. 5, thence 150 feet in a S49° E direction to a corner post marked No. 6, thence 150 1500 feet in a S41° W direction to a corner post marked No. 7, thence 150 feet in a N49° W direction to said end post marked No 2. The locators claim 50 feet in a S41° W direction from point of discovery to the south end line and 1450 feet in the opposite direction from point of discovery to the north end line and feet on each side of the middle of said vein or lode, further claiming all the surface rights, privileges and minerals, with all dips, spurs, angles and variations, and other rights granted by existing laws and customs. This claim is further described as being 50 feet from a natural object or permanent monument in the vicinity, to-wit: (use township and range, if possible) Corner No. 4 bears N 49° W, 50 feet, from Corner No. 3 of the Morgan lode claim (MS 522). Claim occupies Gov't Lot 9 of Section 1, Gov't Lot 11 of Section 2, and the northeasterly portion of Gov't Lot 2 of Section 11, all in T41S, R8W, W.M. The general course or strike of the vein or lode as nearly as may be determined is N41° E - S41° W. On the northeast, the Brandt lode (MS 522); on the northwest, the Kelly lode (MS 416); on the southeast, the Mabel and Copper King lodes (MS 416); on the southwest, the Takilma Belle (unpatented).

This notice is placed at discovery post No. 1; posts are placed at each corner and both center ends, and the name of this vein or lode and date of location are placed on all posts so that the boundaries of the claim may be readily traced. In construing this location notice, the singular includes the plural and vice versa, where the context so requires.

Located this 3rd day of April

Jon Wisconor

TIMBERLAND AND MINERAL PROPERTY SALE CHAMPION INTERNATIONAL CORPORATION JOSEPHINE COUNTY

Sealed bids, addressed to Champion International Corporation, P.O. Box 849, Eugene, Oregon 97440, Attention Thomas D. Lackey, will be received until 12:00 noon on Friday, September 30, 1988, for the sale of land, timber and mineral rights on the tract described as follows:

Portions of Sections 1, 2, 11 and 12, Township 41 South, Range 8 West, Will. Mer., Josephine County, Oregon as follows:

Mineral Lot 416, according to the official Government Survey as described in Mineral Patent from the United States of America, recorded in Volume 24, page 272, Josephine County Deed Records;

Also:

Mineral Lot 522, according to the official Government Survey as described in Mineral Patent from the United States of America, recorded in volume 25, pages 346-349, Josephine County Deed Records;

Containing 222.17 acres more or less.

Form of bid and Terms of Sale

Bids shall be submitted on the attached Bid Form. Each bid shall be accompanied by a certified check, bank draft, or money order in the amount of 10% of the bid price payable to "Champion International Corporation", which in the case of the successful bidder, will be applied as part payment of the purchase price under the terms of the purchase. All other bid payments will be returned to unsuccessful bidders. Following consideration of the offers, the award to the successful bidder will be made not later than noon, Monday, October 7, 1988. Seller, however, reserves the right to reject any and all offers. The sale is contingent on final Corporate approval.

The sale shall be closed within 75 days of the award to the successful bidder. At the time of closing the sale, a Statutory Bargain and Sale Deed will be furnished. Taxes will be prorated at the time of closing. Seller at his expense will give buyer a title insurance policy for the full amount of the purchase price. Copies of the preliminary reports are available upon request.

At time of closing, the successful bidder shall be prepared to pay the remaining balance of the offered price. If bidder fails to close in the time allotted, the bid deposit will be retained as liquidated damages.

Seller may consider an installment sale under arrangements mutually agreeable to both buyer and seller. In the event the bidder offers to buy under an installment plan, the terms of that arrangement must be specified with the bid. Seller will consider such bids that call for not less than 25 percent down and the remainder spread in equal installments not to exceed four years, with interest on the unpaid balance to be at 12 percent per annum.

Copies of certain geological maps, mine shaft and tunnel drawings and other plats concerning the Cowboy, Mable and Lytle mines are available for inspection at the Champion office, 1600 Valley River Dr., Suite 200, Eugene, Oregon.

If further information is required, please contact the undersigned or call (503)687-4731.

CHAMPION INTERNATIONAL CORPORATION P.O. Box 849 Eugene, Oregon 97440

Ellows DLocky