Wallace, Idaho
June 12, 1953

MEMORANDUM FOR MR. M. W. COX

OREGON, DOUGLAS COUNTY
TILLER-DREW AREA
BANFIELD MAMMOTH MINES

Herewith I submit my report on our first personal inspection of the mines in the Tiller-Drew area in Douglas County, Oregon. Previous memoranda and reports detail the growth of our interest from professional reports, publications, and contact with one of the operators. I have not prepared a complete detailed report including all known data because the area is of little interest to us at present. Accompanying maps illustrate all that was learned during my examination.

SUMMARY

The showings of mineralization that have been explored in the Tiller-Drew area are mostly in the May Creek schist formation just west of a north-south fault contact with a series of Tertiary extrusives. The largest set of workings (the Banfield mine) is largely in a fine-grained siliceous intrusive that lies in the fault contact. The chalcopyrite and pyrite mineralization occurs as disseminations in an east-west shear zone in the May Creek schist, as grains and nodules along the schistosity of the May Creek schist, and as irregular massive stringers in the intrusive in the main north-south fault.

The Mammoth Mine consists of one level nearly 200 feet long and a small winze. The Rowley workings are all inaccessible. Of the four levels in the Banfield Mine, only the upper one of some 120 feet length is open. Surface exposures are poor.

In short, the area does not now have any accessible exposure that shows mineralization of any importance. Continued surface reconnaissance would be pointless. The area must be prospected and opened up before any valuation can be put on the exploration merits. Insufficient reason exists for that work to be done by ASARCo.

LOCATION AND ACCESSIBILITY

The Tiller-Drew area largely is along the N-S centerline of T32S, R2W, some 30 miles S.E. of Canyonville on U.S. Highway No. 99 in Douglas County, Oregon. The State Highway No. 227 that goes east from Canyonville through, successively, Days Creek, Tiller, Drew and Trail is an excellent surfaced all-weather road. A partially ballasted mountain road leaves this road between Drew and Trail at the Divide Guard station and climbs to the ridge near the central part of the mineralized area visited. This described route is the best one available as only some four miles of mountain road must be traversed to arrive at the area.

Another route begins at Azalea, a small community 11 miles south of Canyonville. One turns east on the Cow Creek road at that point and continues past the Devils Flat Guard station and the junction labeled Irving Logging Road to near the Diamond Rock Lookout. Of the total distance of 27 miles from Azalea, only four are paved and the last eight miles are steep.

A mountain road leaves State Highway No. 227 at Drew, climbs to the ridge just east of the Banfield Mine, and then travels southward on and along the crest of the range past the Rowley Mine to near Drew Lake. Only a small part of the road is negotiable with ease in bad weather because of the lack of ballast.

GEOLOGY

The rather small area I visited, some fifteen square miles, is occupied by three formations: the Devonian (?) May Creek schist; Tertiary extrusives, a quartz-diorite intrusive. The May Creek schist takes up the w stern part of the area, the Tertiary extrusives the east, and the quartz-diorite is found on the south end. The relationship of the contact of the schist and extrusives to the topography indicates that it is entirely of fault type. The hypothetical major fault is exposed nowhere so far as I could determine, but walking the contact out south of the Banfield Mine showed that it definitely trends north-south and dips eastward.

The May Creek schist is a complex formation. Parts are coarse phyllites, parts are heavily chloritic and/or micaceous, parts resemble fine grained intrusives, a distinctive rock has a dark ground mass with a multitude of aligned, small, lenticular shaped, light colored fragments. Each member is rath r narrow, the maximum thickness being perhaps less than fifteen feet and the average thickness being less than a foot. In a large area around the Mammoth Mine the schistocity strik s roughly N40E and dips 45°S.E. That trend is seen again at the Red Cloud Mine to the north, and again at the Rowley Mine still further north. A sharp bend occurs at the latter property so that the schistocity to the north side of the draw swings rapidly to strike N45W and to dip a little more steeply to the N.E. I did not see any exposure of the formation at the Banfield Mine.

The tertiary extrusives need but little description. Rhyolitic tuffs and breccias, agglomerates and basalts are the three main types. The quartz-diorite intrusive is quite coarse grained. A twenty-foot basalt dike was seen in the intrusive a short distance south of Railroad Gap on the southerly extending ridge of Richter Mountain.

The lack of exposures prevented seeing any pattern of structures. The one fault zone exposed is that in the Mammoth Mine where it strikes roughly east-west and dips from 65° to 75° north. I got the impression from the distribution of the workings and the topography, that the structures at the Red Cloud mine strike northwest-southeast and stand steeply. Some fractures in the intrusive south of Richter Mountain trend east-west and dip 82° south.

Along the northeastern edge of the quartz-diorite intrusive (on the western flank of Richter Mountain) some quartz-muscovite lit par lit intrusions or injections can be seen. South of the Mammoth Mine the quartz masses retain within themselves what would appear to be relict structures or sympathetic jointing that parallels the attitude of the May Creek schist. The rock has perhaps 5 per cent of medium grained muscovite. The fine-grained massive quartz has a pattern of curved fractures an inch or so long that gives a sort of sculptured effect. A similar piece of float was found on the trail north of the Mammoth mine; the quartz veins at the Mammoth Mine are, perhaps, the fingered ends of such apophyses although no sign of muscovite was seen.

BANFIELD MINE

Only a little used, dim trail exists from the one farm on the crest of the range to the Banfield Mine camp, and it can be found only with guidance. The short distance from the camp to the mine workings must be traversed by "dead reckoning" and no apparent trail exists between the upper and lower workings.

Four adit levels exist (see accompanying 50-scale composite plan) but only the uppermost is open. A small trench exposes some copper oxides further up the ridge, but no tie could be made with the workings. Aside from one or two cabins that could be used, no facilities exist on the property. Ample water is available year around from the creek immediately east of the mine workings, and much good timber exists on all parts of the claim group. The old road which connects the mine camp with State Highway No. 227, about one mile north of Drew, is full of down trees and washouts.

Little can be seen at the mine, but it is apparent readily that previous available geological descriptions are not complete. The mineralization has been described as nodules and granules with quartz along the schistocity of the May Creek schist. It is true that some material like that is found on the dump of the lowest adit, but all the adits' portals are in a fine-grained siliceous intrusive and all of the upper levels are completely in the intrusive. The rock cannot be a member of the schist formation. A short distance west of the mine workings, fresh, typical rocks of the May Creek formation are found. Traversing back and forth across the contact of the schist with the intrusive and the Tertiary extrusives shows that it is just west of the sharp, small N-S ridge (containing the mine workings) all the way to the top and that it then angles sharply down the eastern side of the ridge to the creek just south of the main fork shown on the areal geological plan map. The contact, then, definitely, swings back westward in climbing up the ridge crest just east of the Rowley Mine. The overall effect is that the contact dips from moderately to steeply eastward. Apparently, then, the lower working reaches the contact after going through the intrusive for some distance, and the May Creek schist was found to be mineralized on the west side of that contact.

The intrusive has but little extension to the south. Agglomerates and basalts, so far as I could determine, are adjacent to the May Creek formation a short distance south of the mine workings, and I did not see the intrusive along the fault line at any other place. The lack of exposures prevents my saying that it does not occur elsewhere, however. The intrusive breaks down readily to a fine gruss that does not throw-out any fresher float to mark its presence.

Some of the mineralization in the May Creek formation found on the lowest dump is quite impressive but it cannot be seen in place anywhere. Its extent, of course, is unknown. The mineralization seen in the intrusive in the upper workings is far from being commercial, although the flooding of copper oxide minerals (chiefly malochite) along fractures in the intrusive is eye-catching.

ROWLEY MINE

Logging around the area of the Rowley workings has made a mess of the surface. A road fill across the portal of what appears to be the largest working has backed water up to within a foot of the back of the rock portal. Only a little chalcopyrite could be seen on the sizeable dump which is all of the May Creek formation. Further west, adits at the creek level open up a highly siliceous band of pyrite that lies along the schistocity of the May Creek formation. The showing is not a typical vein although it consists of nothing but silica and pyrite. The pyrite is in the form of small crystals uniformly distributed across several feet of the silica "bed". Parts would seem to average as much as 70% FeS_2. Two samples taken are: (a) a 5.0 foot cut across the portal of the southerly trending adit - all badly oxidized; (b) a grab of the fresh sulphide material from the dump. Assays are:

(a)	5.0'	0.08 oz. Au	1.4 oz. Ag
(b)	grab	0.05 oz. Au	1.0 oz. Ag

Further northwest, on the north bank of the creek, surface cuts open up some oxidized parts of the May Creek formation but the high pyrite-silica "member" was not found. As previously mentioned, the May Creek formation shows a single bend of about 90° in the strike of the schistocity in this area. The pyrite bodies would seem to be along the schistocity at the bend.

RED CLOUD MINE

An anomalous mineralization is found in the area between the Rowley and Mammoth Mines, again just west of the contact of the May Creek formation with the Tertiary extrusives. Cinnabar is found in a bleached part of the May Creek formation. The Red Cloud Mine (also known as the Mother Lode) consists of at least four levels, and a small surface plant scattered up and down the north-south draw. The latest mill consists of crushing all the ore and feeding the product into a rotary kiln. Actually no part of the mill or buildings has the least value at present. The last operation was in 1945 and disintegration, following vandalism and robbery, has been rapid.

The cinnabar occurs as tiny, irregular lenses and streaks of a deep purple color in a light-buff-colored rock that is traversed by many tiny, irregular, brown quartz-calcite (?) seams. I got the impression that the vein structure trends northwest-southeast, but only one adit is open for 160 feet, and it is tightly lagged. The Banfield Mine lowest dump has a little of the bleached rock above described, and reports say that some cinnabar occurs on the southern end of that group of claims.

The Red Cloud claim group embraces a good stand of timber that is worth as much as the $160,000 reported to have been put into the mine. A Mr. B. E. Hanson (Route 1, Box 20, Aloha, Oregon) was taking a bulldozer into the mine at the time of my visit. He said the partnership (of which he is a member) planned to have the claims surveyed for patent soon. They do not plan to work the mine, but are looking for someone to lease or buy it.

MAMMOTH MINE

The Mammoth Mine lies on the western side of Richter Mountain within a couple hundred feet of the top (in elevation) and it is reached by a trail that goes around the northern edge of the mountain from logging roads on the eastern flank. The only sizeable working is a 200-foot adit that apparently was driven to get under some showing (not now visible) in a surface cut and winze. (See accompanying Composite Plan)

Massive bull-quartz veins lie along the schistocity of the May Creek formation; only one had a trace of copper stain. The copper mineralization occurs as patches and crystals of chalcopyrite and pyrite disseminated through a sheared, chloritic zone that trends east-west and dips from 65 to 75 degrees north. Two branches of the zone are disclosed by the adit; I suspect that the "showing" in the surface cut is still another paralleling shear that lies ahead of the face of the present adit. The attitude of the May Creek formation is not much changed in crossing the east-west structures, but the chloritic rock along them, nevertheless, is apparently a product of much shearing and hydrothermal alteration.

Certainly none of the mineralization exposed is at all interesting, and localization along the east-west shear indicates that it is , at best, an offshoot or side-issue to the main N-S trending ore zone that I had hoped to find along the fault of the May Creek - Tertiary volcanic contact.

A small mill, with water tanks because of the shortage of water, is on the property, but it has not the least value.

ADAPTABILITY OF GEOPHYSICAL AND GEOCHEMICAL SURVEYS

The mineralization in the subject area is confined, so far as we know, to the fault contact of the two major formational units and to a distance of a couple hundred feet west of that contact. In the area that I traversed, the contact can be located rather closely by surface reconnaissance alone. Consequently, the search for ore may be limited readily to a long, narrow area. What is needed, then, is some survey method that can locate concentrations of sulphides within a rather small area. The first method, of trenching where signs of mineralization can be seen, is not applicable where the signs are weak and obscured. But should sufficient indications be found someplace, trenching should be done in preference to less direct methods. No reason exists to think that mineralization at the surface is any weaker than at moderate depths.

Some geophysical methods do quite well in marking out areas of sulphide mineralization - I understand that Bob Lacy has developed some improvement in such a method. Geochemical sampling of a reconnaissance nature might be worthwhile. A lattice of sample lines 400 feet apart with samples taken at 100-foot intervals would be close enough to first test the areas of greater interest. The country is quite rugged and brushy so the expense of any survey that requires actual traversing of the ground should be estimated with that in mind.

The important consideration, of course, is that no such survey is worthwhile until some further work shows definitely that the area has exploration merit.

CONCLUSIONS & RECOMMENDATIONS

The weak mineralization that can be seen in the few accessible exposures conceivably could lead to the discovery of a commercial ore deposit. But until some venturesome prospector has turned-up good reason to think that that is something more than a mere possibility, the area has no interest for a large company operating under present tax laws. Any additional survey we might make of the immediate Banfield-Mammoth area would amount to nothing more than scientific prospecting of country that is not known to contain, anywhere, any interesting mineralization. Certainly anyone would be justified in discounting the region completely as we know it so far. But persistent prospecting of weak "showings" has turned-up valuable ore deposits in the past.

Consequently, I recommend that we keep advised of work that may be done along the fault contact, and that as time and convenience permits we visit the other prospects south of the Mammoth Mine.

Respectfully submitted,

D. R. WILLIAMSON

APPENDIX:

1. Areal geologic Plan Map - 1:62,500
2. Claim map - Red Cloud Mine - 1" - 1000'
3. Composite plan map - Banfield Mine - 1" - 50'
4. Composite plan map - Mammoth Mine - 1" - 50'

Wallace, Idaho
March 13, 1953

MEMORANDUM FOR MR. W. W. COX

OREGON, DOUGLAS COUNTY
BANFIELD - MAMMOTH MINES

In preparation for the proposed mapping project for next summer in the southern part of Douglas County, Oregon, I have assembled what geological information is available. Included with this memorandum is a map composed of part of Wilkinson's Butte Falls Quadrangle geology revised to fit the far more accurate base provided by the more recent U.S.G.S. topographic map of the Tiller Quadrangle. The geological discussion presented in preceding memoranda becomes more useful and understandable when augmented by this compilation of maps, and the scope of next summer's work may be visualized readily.

I have inquired about aerial photographs since the Tiller Quadrangle topographic sheet is too small a scale to provide an adequate base for the proposed work.

DISCUSSION OF PROBLEM

The copper deposits at the Banfield, Rowley and Mammoth mines are located in mica schists and slates along the western edge of a persistent north-south fault. Wilkinson has mapped the fault for eleven miles south of the Mammoth Mine, hence the known overall length of the structure is the impressive distance of twenty-five miles. A prospect exists northeast of Tiller on the known northern limit of the fault, the Banfield, Rowley and Mammoth Mines are in the middle of the known length, and the Bar Eagle mine is located near the southern end ten miles south of the Mammoth Mine. Doubtlessly, small prospects can be found between the mines of note; some are mentioned in the literature but are not shown on the map. The name "Tiller-Richter Fault" is as good as any for the present for ready reference to this dominant structure.

I should, at the start, state that Wilkinson actually mapped the fault for only eight miles in the southern portion, and for only two miles in the central portion just east of the Red Cloud mine. When I put his geology on the new base, which is greatly different from the Forest Service base he used, the distribution of the formations was altered so much that connecting the two sections of fault and extending it ten miles further north became a logical step.

Generally speaking, Jurassic and older formations lie to the west of the Tiller-Richter fault, and Tertiary extrusives lie to the east. The demarkation is quite rigid south of the area included in the accompanying map, but from Tiller to Richter Mountain the contact of the Tertiary extrusives lies on, and on both sides of the fault. Study of the Tertiary-"older" contact with respect to the topography and the Tiller-Richter fault suggests that it is a fault contact in places, and merely an erosional contact in others. The importance of determining correctly the nature of each portion of the contact is evident.

West of the fault the rocks very largely are greenstones, mica schists and slates intruded by a quartz diorite. The ore at the various mines occurs along the schistosity of the schist. At the Red Cloud and Mammoth mines the trend is N-25-E approximately; at the Banfield Mine the trend is N-S.

MAPPING PROJECT

Only the central portion of the area discussed in the preceding section of this memorandum is proposed for further study. We should map the various mines and prospects in the Banfield to Mammoth area, and, to gain an overall appreciation of the setting, we should map some twelve square miles of the intervening and surrounding country. Judging from the literature, quite thorough sampling of accessible workings seems warranted.

When this preliminary work is accomplished, we will have concrete data on which to form an intelligent opinion as to the possibilities of the area and, also, we will know what sort of geophysical and/or geochemical work is applicable.

Respectfully submitted,

Dick R. Williamson

D. R. WILLIAMSON