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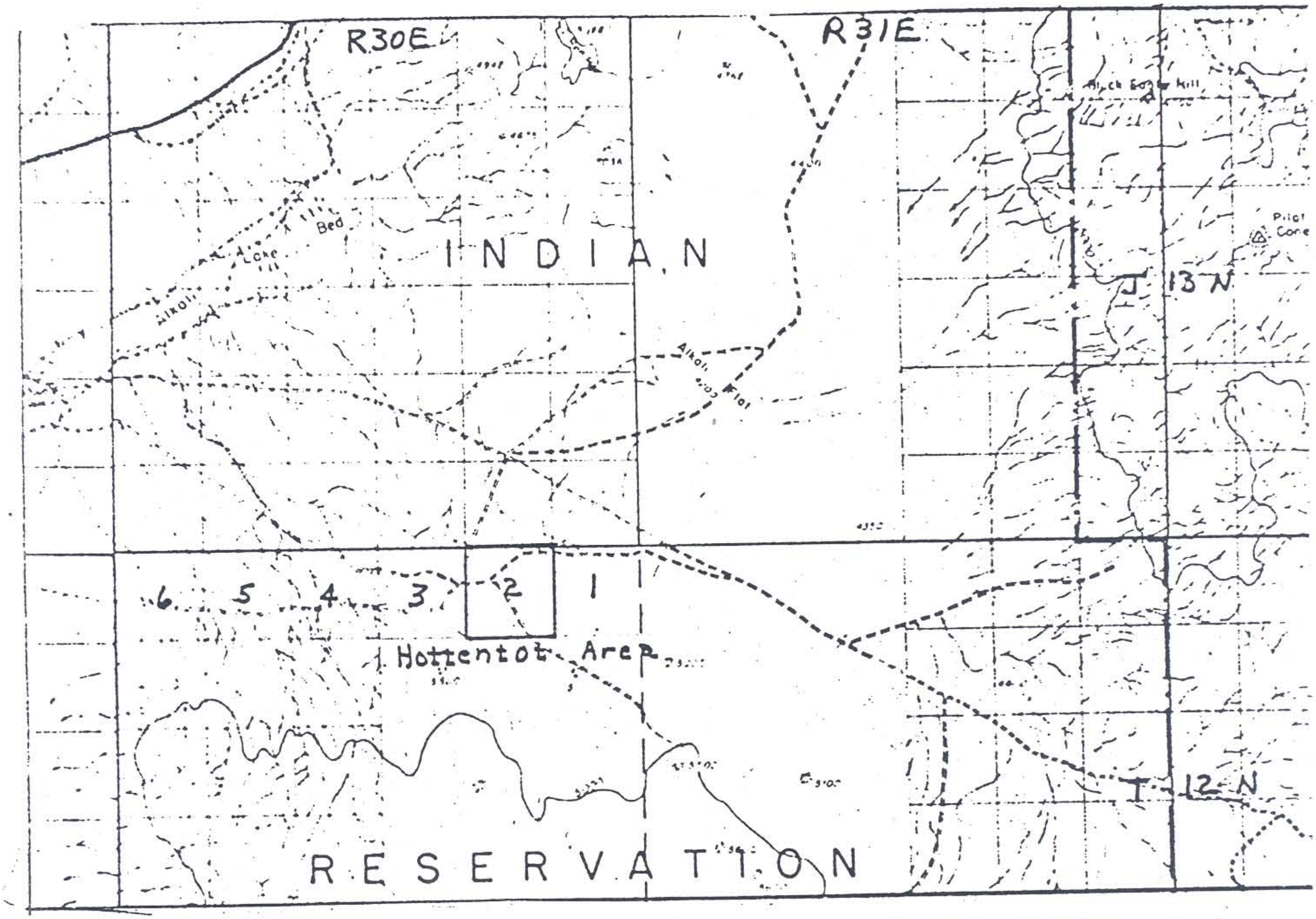
Report for: Walker-Martel Mining Company

By: Robert E. Holt 2/25/66

PROPRIETARY

Subject: Review Hottentot Area Data



From the geologic mapping and drill core logging, there is little or no evidence to suggest that the surface volcanics are anything but post ore. The diorite in which the ore occurs outcrops; however, its outcrop pattern has no apparent effect upon the magnetic configuration. Therefore, it is suggested that the magnetic anomaly is a measure of the magnetite in the diorite and, further, that the magnetite is epigenetic with regard to the diorite.

Because of the sulfides found to be associated with the iron ores, attempts have been made to utilize I. P. to delineate the ore zones. This has met with less than satisfactory results and, in my opinion, should not be attempted again, at least not in the iron ore zones. Those who claim success for I. P. here are undoubtedly utilizing an extremely high percentage of S.W.A.G.'s in their interpretation.

The drilling suggests that the diorite outcropped as a bold, steep-sided hill, and during this time the iron zones were also outcropping and undergoing erosion and oxidation. In the thirteen holes drilled, with the exception of two, one on the main Hottentot and one on the south Hottentot, all intersected ore grade iron. The mineralogy is varied in detail but consists generally of limonite, hematite, magnetite, pyrite, pyrrhotite, and chalcopyrite.

The zones of mineralization are all characterized by silicification, chloritization, argilization, albitization, and by fracturing and shearing. A fence diagram, such as the peg diagram prepared by Redmond, points out the difficulty of connecting the mineralized zones into a definite, uniformly mineralized zone for the entire area. In fact, it suggests that perhaps we are dealing with separate mineralized zones in which there are pods of ore and patches of barren country rock. This pattern resembles the large porphyry copper deposits which occur in uniform rock types where the grade and intensity of mineralization are dependent upon the degree of structural preparation of the host rock and, to some extent, of the amount and character of the alteration. I suspect many of the smaller iron ore bodies near Lovelock, Nevada, are of this nature. This is in contrast to the large, reasonably uniform iron ore bodies found in sediments or metasediments where individual beds or series of beds are mineralized.

Because of the suggested erratic nature of the mineralized zones of the Hottentot and the complex character of the ore mineralogy, it may not be possible to use the inflection points from the magnetic profiles to outline the ore zone. This method could easily indicate more ore than actually exists, or give an underestimate of the tonnage, particularly if the hematite content exceeds the magnetite content in certain areas.

A study of the three anomalies, Main Hottentot, South Hottentot, and East Hottentot, suggests that the latter two are superimposed on the Main Hottentot anomaly. The Main Hottentot anomaly, and to a lesser degree the East Hottentot anomaly, is less erratic and more uniform in nature (at least as far as the contouring is concerned) than the South Hottentot. I strongly suspect that this is due to the ameliorating effects of depth of burial of the mineralized zones. This is not to say that the amount of mineralization will have no effect on the anomaly, for indeed it will. It is my opinion from the data we now have on hand that the mineralization in the Hottentot Area will be characteristically nonuniform in grade and mineralogy and that the occurrences may be erratic and pod-like, necessitating selective mining and milling. I do not mean by this to intimate that the prospect is non-economic; I mean only to point out that its evaluation is going to be complex and far from straightforward.

For some reason, completely obscure to most observers, iron ore deposits similar to this one generally have steep dips, are low "phos", may or may not be titaniferous, and frequently contain martite. Many of these bodies are more uniform than the South Hottentot appears to be. For instance, at Lyon Mountain, New York, one of the iron ore bodies is 20 feet wide, 5000 feet long, and extends 1600 feet down the dip. It would be interesting to compare a magnetic anomaly from a body such as this with the Main Hottentot anomaly.

At the Hottentot, and in particular the South Hottentot, drilling costs per ton of developed ore could be higher than usual as a consequence of the nonuniformity of grade and possible pod-like nature of the ore bodies. If it is amenable to open-pit operation, dilution will be at a minimum; however, if it is found necessary to go to an underground block caving method of mining, dilution will be a most critical factor to consider in evaluating the prospect. The ore bodies might be amenable to underground stoping methods, but it is extremely doubtful that the value of the ore per ton would permit this relatively high-cost method of mining to be used.

There are sulfides containing copper associated with the ore. It is therefore reasonable to consider prospecting in the immediate vicinity of the magnetic anomalies for copper. The Lyon iron ore body of U. S. Steel at Yerington also contains copper. The significance of the copper is yet conjectural, for the peripheral areas of this ore body have not been prospected. Nevertheless, the 500 million tons of iron ore are rumored to carry 0.25% copper. In anyone's league, this represents a major concentration of copper. Because of this, it is reasonable to assume that there could be a major copper ore body close by. Some of the major "porphyry" copper deposits are associated with magnetic lows. An example of such an occurrence is Anaconda's Yerington mine.

The magnetic low that is north of the South and East Hottentots and which extends east from them is worth considering as a possible "hunting ground" for copper. The intriguing thing here is the very close association of the copper sulfides which occur in and near the iron ore of the Hottentot and the magnetic low. While there is no assurance that the sulfides continue into the area of the low, the speculative possibilities are there. I.P. over this area might be useful. There may be an I.P. line or two that has crossed these lows; however, since the data have not been compiled on a single base, it is difficult to tell.

Since the company will soon be required to select a mining lease at the Hottentot, its complete evaluation must proceed immediately. The recommendations that follow are arranged in sequence, and the decision to proceed from one recommendation to another is dependent upon positive results in each completed step.

Recommendations

1. Metallurgical testing should be done on the South Hottentot core to determine the type product to be marketed and the cost estimates to produce the product, excluding mining and shipping, should be determined.

2. Acquire mineralogical data from the core, utilizing thin sections, X-ray, spec. and whatever else is necessary to determine rock type and type of alteration. This step should be taken regardless of the results in step #1, for the information acquired could be useful in further exploration for both iron and copper ores in the same environment. Selected portions of the core from three holes in the South Hottentot and both holes from the East and Main Hottentot anomalies should be checked. Samples of the diorite should be selected from above, below, and within the mineralized horizons. If the results appear to significant, you may want to select samples from all of the holes for testing.

3. Compile all the available data, using overlays, at 1"=100'. Draw cross-sections, calculate reserves, make reasonable assumptions on character and nature of the ore and host rock.

4. Determine whether the product to be produced can be sold and in what quantity and to whom and at what price per unit.

5. Using available tonnage estimates, estimate reasonable per-unit production costs, including mining, concentrating, freight and haulage, and plant amortization. Capitalization requirements if a mill is found to be necessary may be such that the minimum tonnage requirement for an economic operation will not permit mining the deposit as an independent unit, but will necessitate delaying mining until the Calico deposit is put into operation.

6. Diamond Drilling

A. South Hottentot

Step-out drilling can be started on the South Hottentot first because of the near-surface ore. The most information for the least money can be acquired here. The drilling already completed has established the presence of ore grade material estimated conservatively to be 250,000 tons. The early drilling should be exploratory as well as developmental and should be designed to find the limits of the known ore zone. The zone is "open" in all directions. I would recommend that the first hole be drilled 200 feet east of hole 3 in an attempt to determine whether the South Hottentot and East Hottentot ore zones connect.

A rough contour of the mineralized intercepts indicates that the ore zone is east-west; therefore the next hole should be drilled

150 feet N45°W of hole 3D to check the continuity of the thick ore section intercepted in holes 3B and 3D. Because of the steep slope of the magnetics north of hole 3B, one is tempted to step out only 100 feet north. However, I would prefer going out at least 150 feet, which would put the hole on the shoulder of the anomaly and thus possibly limit the ore zone in that direction.

A hole should be drilled approximately 100' west of 3A and taken to sufficient depth to adequately test the possibility of ore at depth that is suggested by the magnetic data. The mineralized intercepts in 3A and 3H are not sufficient to explain the anomaly in this area.

A hole should be drilled approximately 150 feet east of hole 3F to determine the eastern limits of the ore intercepts in hole 3F and 3.

The first hole drilled should be taken well into the diorite to determine a definite bottom to the ore zone and also to explore for the possibilities of copper.

B. East Hottentot

Drilling should be resumed here on the same basis as that on the South Hottentot, which is on a step-out-exploratory basis. Holes can be spotted, as has already been indicated, 100 feet in three directions from the two holes already drilled. An additional hole to those suggested would be located 100 feet south and 300 feet east of hole #6 to check the extension of mineralization in that direction as is suggested by the magnetics. Drilling would continue on a step-out basis until the ore zone is outlined.

C. Main Hottentot

Drilling on this large anomaly has been disappointing to date. The total mineralization intercepted in the first hole is 62 feet, with one zone of 32 feet representing the greatest single intercept. The second hole had only sporadic magnetite mineralization, mostly as discrete grains and a few small veins. Hole #1 went to a depth of 1228 feet and encountered the best mineralization at 713 feet. Hole #1A, which was south of hole #1 and taken to a depth of 1046 feet, failed to intercept significant mineralization of any type. This is extremely disconcerting, since both holes were drilled well within the high part of the anomaly.

The contours of the anomaly suggest a north-dipping body elongated in an east-west direction. The South and East Hottentot anomalies appear as small entities on the southeast flank of this anomaly. If the anomaly is a magnetic reflection of a buried iron ore body, then that body contains a very large tonnage and is certainly worthy of further exploration. Anomalies of this magnitude drilled in this part of Nevada have a history of producing ore bodies.

Exploration will not be inexpensive, since the top of the body in hole 1 is 713 feet and if, as is suggested, the ore zone dips north, the drilling depths will increase in that direction. It is extremely doubtful that the integrated 62 feet of magnetite encountered in hole #1 can account for this anomaly. The features of this anomaly, which can be used as a broad qualitative indication of the depth to the source of the anomaly, are compatible with a source well below that found at the South Hottentot. The asymmetrical character of the contours suggest a north dip of the source. Moreover, an inclination of the magnetic axis would give rise to a magnetic low on one side of the center similar to the one existing on the east flank of the Hottentot anomaly.

A discovery has already been made on this interesting anomaly, and the only thing remaining to do is to follow it up with further drilling. It certainly warrants at least one more hole drilled to a depth of 1500 feet, located north of hole #1, probably along a line 300 feet west between the 1500 and 2000 gamma interval shown on the 3/12/63 Jalander survey, unless this particular survey has been discounted for some reason. Continued drilling would depend upon the results from this hole and would be on a step-out basis. Distance between future holes would be determined by the horizontal continuity of the ore zone between the first few holes.

It is always dangerous to abandon a prospect such as this one on the basis of one or two discouraging holes. If two more holes were to be considered, the obvious locations for them would be within the abovementioned zone between the 1500 and 2000 gamma contour, one west of the earlier holes and the other east - and both taken to at least 1500 feet in depth. If these holes encountered only sporadic mineralization, certainly no further work would be warranted here.

Whether these prospects should be drilled by Walker-Martel-Occidental funds is out of my province and has not been considered in this review.