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REPORT FOR STANDARD SLAG COMPANY

ON A MAGNETOMETER SURVEY

ON THE PHELPS STOKES IRON DEPOSIT, NYE COUNTY, NEVADA

By

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Reno, Nevada
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INTRODUCTION

This report presents the results of a magnetometer survey made for the Standard Slag Company on the Phelps Stokes iron deposit, Nye County, Nevada. The deposit is located in the western foothills of the Paradise Range, in Section 21, T. 12 N., R. 37E. Magnetite ore crops out along a northwesterly trending small ridge or spur, and at present the Company is mining in the outcrop area. Immediately northwest of the mining area the bed rock is completely covered by a mantle of alluvium, and geologic features and relationships cannot be determined by surface observation.

The chief purpose of the magnetometer survey was to test the alluvium-covered area for a distance of 400 or 500 feet northwest of the exposed ore, to trace possible extensions of the ore body and, if results were favorable, to locate sites for diamond drilling. As the first traverse showed high magnetic readings north of the lower cuts, the survey also was extended southeastward as far as possible into the mining area. The field work was done during the second week of September 1951. All measurements were made with a standard Askania vertical magnetometer.

GEOLOGY

The Phelps Stokes ore body is composed largely of magnetite, which replaces limestone along a contact between the limestone and intrusive granodiorite. It strikes in a general northwesterly direction and dips approximately 60 degrees to the southwest. The ore originally cropped out for a distance of some 800 feet along the north and west slopes of a small ridge. Down the slope to the northwest, the outcrop terminates abruptly against deep alluvium, and exposures by mining operations suggest that the ore is cut at this point by a cross-fault. The relationships between ore and waste blocks exposed in benches above the lowest cut also indicate that the ore body is broken by one or more strike faults.

MAGNETOMETER SURVEY

Plan of the survey

The plan of the magnetometer survey is shown on the magnetic map that accompanies this report. An arbitrary zero point was selected just northwest of the mining area, on the east side of the main haulage road. From this point, a grid base line was projected and staked on a bearing of N. 56° W., and the 0 magnetometer traverse was run along the road on a bearing of N. 34° E. Parallel traverses were run at 100-foot intervals for a distance of 400 feet west of the 0-point, and at 50-foot intervals for a distance of 250 feet east of the 0-point. In order to complete the magnetic anomaly curves, the 0 traverse and the 300W and 400W traverses were run 300 feet north and 500 feet south of the base line. On the other traverses, where interference was encountered from the ore stockpile, the mining cuts, and road fills, measurements were extended as far as was practicable, as shown on the map. On all of the traverses, magnetometer stations were occupied at intervals of 25 feet over the anomalous zone and at intervals of 50 feet on the borders.

The 0 traverse showed a strong magnetic anomaly over the projected trend of the exposed ore. The western traverses were run to trace this anomaly westward over the alluvium-covered area. The eastern traverses were run to obtain magnetic detail in a strongly anomalous zone lying north of the western part of the present mining area.

Results of the survey

The results of the magnetometer survey are shown on the magnetic map and profile sheet that accompany this report. The profiles, which are plotted on a horizontal scale of 100 feet to the inch and a vertical scale of 3000 gammas [1/] to the inch, show the exact magnetic variations found along the main traverse lines. The shorter eastern lines, all of which are very similar to the 100E line, are not shown. The magnetic map, which is drawn on a scale of 50 feet to the inch and contoured on an interval of 1000 gammas, shows in plan the variations in the magnetic field over the surveyed area.

Basically, the magnetic readings show a single, strong, sharply defined major anomaly that extends across the surveyed area approximately on the projected trend of the exposed ore. As shown by the profiles, the anomaly west of the 0 line is a single broad positive peak that reaches maximum values of more than 10,000 gammas. Because of the southerly dip of the ore body, the anomaly is somewhat asymetrical. As shown by both the profiles and the map, on the 0, 100W, and 200W lines the maximum magnetic intensities are essentially identical, and the curves are very similar in general outline. On the 300W line the anomaly, although still strong, decreases in intensity and broadens, and this effect is still more marked on the 400W line. Just east of the 0 line, the magnetic map shows a sharp break and a general change in relationships, and the eastern profiles show steeper curves and much higher values.

1/ 1 gamma = 0.00001 gauss, the unit of magnetic intensity. The earth's magnetic field has a total intensity of approximately 0.6 gauss, or 60,000 gammas.

On the basis of the magnetic characteristics just described, and assuming a reasonable continuity in size and attitude, as is indicated, it may be postulated (1) that just east of the 0 line the ore body is cut and dropped down on the west along a major cross-fault of northerly strike, (2) that in the alluvium-covered area the top of the ore body probably is at the buried bed rock surface, (3) that between the 0 line and the 200W or 300W lines the body may occupy a buried ridge or shoulder on which the depths to the apex remain about the same, and (4) that between the 200W and 300W lines the depth begins to increase, probably still following the rock surface. The marked decrease in intensity between the 300W and 400W lines may indicate the presence of another cross-fault, but, aside from increasing depth, the general character of the curve suggests a pinching or wedging out of the ore.

Under ideal conditions, and for vertical or nearly vertical bodies, rather reliable depth calculations can be made. In the present instance, the problem of depth determinations is complicated by the dip of the body, and, in particular, by the fact that most of the profiles could not be completed because of local interference. In the western part of the grid, calculations based mainly on the north sides of the curves indicate depths on the order of 125 to 160 feet. On the 0 line, which shows a double peak, the north side indicates a depth of about 100 feet and the south side a depth of about 160 feet. The latter figure, in particular, is questionable, because of local irregularities in the curve. It should be emphasized that all of these figures are tentative only, and that the actual depths may vary rather widely from them. The depths may be greater than indicated, especially if the

body is essentially all fresh magnetite, although the general strength and breadth of the peaks suggests that the depths may be less. Whatever the depths may be to the top, the buried body probably extends well down dip. The high magnetic intensities, and, in particular, the lack of negative borders, suggest a very considerable depth extent.

East of the 0 line the magnetic profiles all show sharp, strong double peaks, separated by a sag that centers approximately at 100S. The general relationships are well shown by the magnetic map. The very high southern readings are associated with the exposed ore in the mining cuts. The northern peaks occur in an area of country rock that is largely covered by thin alluvium and in part by road fills.

The magnetic and geologic relationships indicate that a block or slice of the exposed ore body has been dropped on the north along a fault or series of faults trending subparallel to the strike of the body. Geologic confirmation appears in the bench that is indicated diagrammatically on the map, where a slice of ore lying between blocks of waste shows a distinct northward dipping fault surface. The structure may be further complicated by local folding, and it is possible that the north block originally was formed by replacement of limestone on one limb of a fold. This entire complex is sharply terminated on the northwest by the northerly trending cross-fault. Although none of the curves could be completed because of the cuts and fills, rough calculations indicate depths of 100 feet and less to the top of the north block. This ore may have been cut by U. S. Bureau of Mines diamond drill hole PC-1, which is reported to have "encountered very wide ore".

RECOMMENDATIONS

The recommendations made herein cover preliminary diamond drilling only. The buried bodies indicated by the magnetic survey should be well worth testing, but until preliminary holes have determined the depth and grade of the ore, and until those familiar with the whole operation can determine the feasibility of mining the ore at depth, more detailed recommendations would be premature.

It is believed that three or four preliminary vertical holes should be drilled on or near the indicated apex, two in the western covered area, and one or two in the zone of the north anomaly east of the 0 line. Vertical holes are recommended because the magnetic depth calculations are not too certain, because the curves suggest some variations in the attitude of the body, and because, considering the dip, the positive anomaly as a whole may be shifted somewhat with respect to the buried body. Irrespective of attitude, the maximum point of the positive anomaly will occur directly above the positive pole that marks the upper part of the buried body. Because of the dip, however, the holes should be kept somewhat south of the magnetic peaks, but near enough to the peaks to be reasonably sure that the highest part of the body will be encountered.

It is recommended that the first hole be drilled just west of the haulage road, at about 50W and 115S of the grid. This location may have to be shifted a little to the west to avoid the road fill. This hole will test the depth and grade of ore close to the present mining area, and it should avoid any bad ground that may be associated

with the postulated major cross-fault. The other western hole should be drilled on or near the 200W line, at about 75S. This hole, which may be shifted 25 feet or so to the west if desired, again will test depth and grade, and it also will provide a check on the idea of a buried ridge or spur associated with the mineralized zone. Considering the regularity of the magnetic anomaly, generally uniform conditions may be assumed to exist between these locations.

In the northern part of the eastern area, the first hole can be drilled at any feasible location within the indicated maximum positive zone. A good first location would be on or a little east of the 50E line at about 40S or 45S. A second hole, or the first hole if desired, might be drilled on the 150E line, at about 55S.

The recommended preliminary locations are indicated by red circles on the magnetic map. If these holes show a good grade of ore and depths within mining range, further testing and blocking out of ore probably can best be done by drilling inclined holes from the south.

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