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Compiling Data from Geological, Mineralogical and Geophysical (IP/RS) Studies on Mahour Deposit, Northwest of Deh-salm, Lut Block

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Introduction

The Mahour exploration area is a polymetallic system containing copper, zinc and silver. The mineralization can be seen in two forms of veins and disseminations. This area is structurally within the Lut block, west of Deh-salm Village. Recent exploration work and studies carried out by geologists on this volcanic-plutonic area of Lut demonstate its importance indicating new reserves of copper, gold, and lead and zinc.

Several articles have been published on the Mahour deposit in recent years, including work on fluid inclusions (Mirzaei et al., 2012a; Mirzaei et al., 2012b).

The present report aims at completion of previous studies on Mahour. During the course of this research, the IP/RS geophysical methods were used to locate the extent and depth of sulfide veins in order to locate drill sites. The IP/RS method has been used extensively worldwide in locating sulfide mineralization at deposits such as Olympic Dam in Australia (Esdale et al., 1987), Hishikari epithermal gold deposit in Kagoshima, Japan (Okada, 1995) and Cadia-Ridgeway copper and gold deposit in New South Wales, Australia (Rutley et al., 2001).

Materials and Methods

1. Determination of mineralogy of ore and alteration by examination of 70 thin sections and 45 polished sections.
2. Compilation of geological and mineralization maps of the studied area at a scale of 1:1000.
3. Geological, alteration, mineralization and trace element geochemical studies of 6 drill holes.
4. IP/RS measurements for 2585 points on a rectangular grid with profile intervals of 50 meters and electrode intervals of 20 meters.
5. Interpretation of IP/RS results.

Discussion

The Mahour area is covered by a volcanic sequence of basalt, andesite, dacite, rhyolite and pyro-clastics. During the Late Eocene through Early Oligocene this volcanic complex was intruded by several diorite and quartz-diorite bodies, which were responsible for mineralization of the area. Mineralized veins hosted by dacite show NNE trends with 85 t0 90° dips, and which are accompanied by argillic, silicic, quartz-sericite-pyrite and propylitic alteration zones. The primary minerals include pyrite, chalcopyrite, sphalerite, galena, tetrahedrite, and quartz along with supergene minerals such as malachite, atacamite, azurite and goethite. High anomalies of copper (up to 103062 ppm), zinc (up to 213520 ppm) and silver (up to 1988 ppm) are present in the studied area.

The IP/RS surveys were carried out on profiles perpendicular to the veins. The chargeability levels reached 40 msce, indicating the presence of sulfide minerals in the area. Two especially anomalous resistivity zones, high and low, were detected within the deposit. The high resistivity zone, up to 350 ohm.m, occurs along geophysical profiles in association with less-crushed zones, whereas the low anomaly zone is related to highly crushed zones.

The geophysical anomalies agree with drilling results indicating zones of highest mineralization.

Results

Generally, the chargeability surveys have clearly revealed two anomalous zones: one in the northeast and the other in the southwest of the studied area. Six holes have been drilled through

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these anomalous zones and geochemical samples taken at intervals of 1 meter in each hole. Most of the anomalies are associated with quartz-sericite-pyrite, silicification and chloritic alteration as well as the intense distribution of secondary iron oxides.

Geochemical results from the drill holes show the highest anomalies as follows:

GBH-1, 78-92 m, 246-281 m
GBH-3 20-40 m and 133-152 m
GBH-7 20-32 m and 57-65m
PB-1 85-94 m. and 133-140 m
PD-1. 50-55 m, 298-301 m and 360-365 m
PA-1 48-57 m, 152-161 m and 212-218 m

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