Integrated Geophysical Survey for Mineral Exploration at Prospect-05, Shinkai Site, Muhammad Khel, North Waziristan

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This research provides the results of integrated geophysical survey consisting of electrical resistivity and induced polarization methods at prospect-05 at Shinkai site, Muhammad Khel, North Waziristan for the exploration of minerals and ore bodies. Vertical electrical sounding (VES) was conducted at ten locations distributed randomly covering all prospective areas. The 2-D survey of the proposed prospect (P-05) site, comprising 10 survey lines, was also conducted to scan the area completely. The VES (1-D) investigations remained useful as the anomalous zones were hit at probes 1, 4, 5, 6, 7, 8, and 9 at different depths. The VES indicated good electrical contrast between different rock formations and ore bodies. In VES, the resistivity data is also processed separately for better understanding of subsurface geology. The 2-D investigations were conducted for detailed subsurface investigations through a grid of parallel and perpendicular lines with a spacing of about 90-110 meters among survey lines depending upon topography. The depth target of more than 250 m was achieved through use of pole-dipole electrode configuration. The 2-D investigations yielded successful results as subsurface anomalous zones are delineated under the 2-D lines 1, 2, 3, 4, and 7 at varying depths, also confirmed by VES probes 6, 8 and 9 falling near the 2-D lines 1 and 4. The VES investigations yielded that either the conductive body is continuous with large size or there exist more than one body in the area at the varying depth of 25-130 meters form general ground surface. The volume of resistivity/conductivity and chargeability anomalies are calculated for low, moderate, good, and strong mineralization. Eight points are recommended for exploratory boreholes drilling at different locations in the exploration area.