Karakterisasi Formasi, Litologi, Alterasi, dan Mineralisasi Batuan Berdasarkan Data Suseptibilitas Magnetik di Area Tambang Bawah Tanah Kucing Liar PT Freeport Indonesia = Formation, Lithology, Alteration, and Mineralization of Rock Characterization Based on Magnetic Susceptibility Data in Kucing Liar Underground Mine Area PT Freeport Indonesia

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Abstrak

Tambang Bawah Tanah Kucing Liar merupakan salah satu area eksplorasi PT Freeport Indonesia yang terletak di Kabupaten Mimika, Provinsi Papua Tengah. Lokasi ini memiliki potensi mineralisasi tembaga (Cu) dan emas (Au) yang berasosiasi dengan sistem hidrotermal porfiri. Adanya keterkaitan antara sistem hidrotermal porfiri dan sifat kemagnetan batuan menyebabkan penelitian perlu dilakukan. Pada penelitian ini, dilakukan korelasi data suseptibilitas magnetik batuan dan data geological logging untuk mengkarakterisasi sifat kemagnetan formasi, litologi, dan alterasi batuan pada area penelitian. Selanjutnya, dilakukan perhitungan nilai copper equivalent (CuEqv) berdasarkan hasil korelasi data suseptibilitas magnetik batuan dan data geochemical assays. Hasil dari korelasi tersebut, selanjutnya dianalisis secara statistik dan divisualisasikan melalui boxplot, striplog, dan penampang 2D. Hasil penelitian menunjukkan bahwa nilai suseptibilitas magnetik tinggi berkorelasi dengan Formasi Waripi dan Ekmai Limestone, litologi dolomite dan limestone, serta alterasi exoskarn dan replacement sulphide yang berasosiasi dengan mineral magnetik yaitu magnetite. Terdapat hubungan positif kuat antara nilai suseptibilitas magnetik dan mineralisasi copper equivalent (CuEqv) pada beberapa interval kedalaman. Selain itu, interpretasi distribusi suseptibilitas magnetik batuan menunjukkan pola anomali yang dapat mengindikasikan zona mineralisasi. .....The Kucing Liar Underground Mine is one of the exploration areas of PT Freeport Indonesia, located in Mimika Regency, Central Papua Province. This area has potential copper (Cu) and gold (Au) mineralization associated with a porphyry hydrothermal system. The relationship between the porphyry hydrothermal system and the magnetic properties of rocks highlights the need for this study. In this research, magnetic susceptibility data of rocks were correlated with geological logging data to characterize the magnetic properties of formations, lithologies, and alteration zones in the study area. Futhermore, copper equivalent (CuEqv) values were calculated based on the correlation between magnetic susceptibility data and geochemical assay data. The correlation was then analyzed statistically and visualized using boxplot, striplog, and 2D cross-sections. The results show that high magnetic susceptibility values are correlated with the Waripi and Ekmai Limestone Formation, dolomite and limestone lithologies, and exoskarn and replacement sulphide alterations, which are associated with magnetic minerals such as magnetite. A strong positive correlation was observed between magnetic susceptibility values and copper equivalent (CuEqv) mineralization at several depth intervals. In addition, the distribution of magnetic susceptibility indicates anomalous patterns that may indicate potential mineralized zones.