ABSTRAK

ANALISIS SEBARAN ZONA MINERALISASI EMAS MENGGUNAKAN METODE *TIME DOMAIN INDUCED POLARIZATION* PADA LAPANGAN "HEH", MINAHASA UTARA

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Lapangan "HEH" di Kabupaten Minahasa Utara, Sulawesi Utara, merupakan salah satu wilayah yang memiliki aktivitas penambangan emas rakyat. Penentuan lokasi penambangan di daerah ini didasarkan pada indikasi permukaan tanpa didukung informasi geologi bawah permukaan, sehingga menyebabkan terbentuknya sejumlah lubang tambang tidak produktif (*barren zone*). Penelitian ini bertujuan mengidentifikasi sebaran zona mineralisasi emas bawah permukaan menggunakan metode *Time Domain Induced Polarization (TDIP)*. Akuisisi data dilakukan pada 10 lintasan dengan konfigurasi *dipole-dipole*, panjang lintasan 470 m, dan spasi elektroda 10 m. Data diolah menggunakan *RES2DINV* dan dimodelkan secara 3D menggunakan *RockWorks*. Hasil penelitian menunjukkan bahwa zona mineralisasi emas dicirikan oleh nilai resistivitas 20-150 Ωm yang berasosiasi dengan nilai *chargeability* tinggi (>60 msec). Analisis *fence* penampang mengindikasikan bahwa mineralisasi dikontrol oleh struktur berarah barat laut-tenggara dibagian tengah area penelitian yang berperan sebagai jalur migrasi fluida hidrotermal. Mineralisasi terutama terjadi pada litologi tuf, yang berfungsi sebagai batuan induk bagi zona urat mineral. Pemodelan 3D menunjukkan zona sulfida mulai teridentifikasi pada elevasi 100-110 m dan elevasi 170-190 m, sehingga zona prospektif mineralisasi secara keseluruhan diestimasi berada pada kedalaman 10-90 m, dengan empat titik prioritas rekomendasi tambang (HEH-01 hingga HEH-04) pada kedalaman dangkal 13-45 m dan sebaran dominan di bagian tengah area penelitian.

Kata kunci: *chargeability*, *induced polarization*, mineralisasi emas, resistivitas, *TDIP*

ABSTRACT

ANALYSIS OF GOLD MINERALIZATION ZONE DISTRIBUTION USING THE TIME DOMAIN INDUCED POLARIZATION METHOD IN THE "HEH" FIELD, NORTH MINAHASA

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The "HEH" field in North Minahasa Regency, North Sulawesi, is one of the areas with artisanal gold mining activity. The selection of mining sites in this area was based on surface indications without the support of subsurface geological information, resulting in the formation of a number of unproductive mine pits (barren zones). This study aims to identify the distribution of subsurface gold mineralization zones using the Time Domain Induced Polarization (TDIP) method. Data acquisition was conducted along 10 lines using a dipole-dipole configuration, with a line length of 470 m and an electrode spacing of 10 m. The data were processed using RES2DINV and modeled in 3D using RockWorks. The results show that the gold mineralization zones are characterized by resistivity values of 20-150 Ωm associated with high chargeability values (>60 msec). Fence section analysis indicates that the mineralization is controlled by a northwest-southeast-trending structure in the central part of the study area, which acts as a migration pathway for hydrothermal fluids. Mineralization occurs primarily in tuff lithology, which serves as the host rock for the mineral vein zones. 3D modeling shows that sulfide zones begin to be identified at elevations of 100-110 m and 170-190 m; thus, the overall prospective mineralization zone is estimated to lie at depths of 10-90 m, with four priority mining recommendation sites (HEH-01 through HEH-04) at shallow depths of 13-45 m and predominantly distributed in the central part of the study area.

Keywords: chargeability, induced polarization, gold mineralization, resistivity, TDIP