

INTISARI

IDENTIFIKASI DAN ANALISIS ZONA PENCEMARAN AIR TANAH MENGGUNAKAN METODE POLARISASI TERINDUKSI DI DAERAH DIENG, JAWA TENGAH

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Air menjadi salah satu sumber daya alam di bumi yang sangat dibutuhkan manusia dan akan sangat merugikan kehidupan apabila tercemar. Di Dieng, Jawa Tengah, warga setempat mengalami pencemaran air. Seiring berkembangnya kegiatan eksplorasi panas bumi Dieng, warga mengeluh akan air sumur yang tercemar menjadi berwarna keruh dan berbau. Hal tersebut menyebabkan warga tidak bisa memenuhi kebutuhan sehari-hari dengan air sumur di sekitar rumah dan beralih kepada air dari Gunung Prau. Penelitian untuk mengetahui pencemaran air tanah menggunakan metode *Induced Polarization* dengan konfigurasi *dipole-dipole* dan jumlah lintasan sebanyak 9 lintasan. Jarak antar elektroda ialah 10 meter dengan faktor pengulangan sebesar 6. Pemetaan geologi lokal yang dilakukan selama akuisisi beserta informasi sumur dari warga menjadi data pendukung dari penelitian ini. Hasil pengolahan dibagi menjadi tiga daerah yaitu daerah barat, utara, dan timur. Daerah barat menunjukkan bahwa zona air tercemar teridentifikasi pada rentang resistivitas 1,2-24 Ωm dan chargeabilitas pada rentang 8-30 msec. Sedangkan untuk zona air tercemar di daerah utara teridentifikasi pada rentang resistivitas 1,2-18 Ωm dan chargeabilitas pada rentang 8-65 msec. Terakhir, daerah timur teridentifikasi pada rentang resistivitas 2,9-24 Ωm dan chargeabilitas pada rentang 8-53,5 msec. Dari hasil pengolahan di seluruh daerah penelitian tersebut diketahui bahwa zona pencemaran air tanah memiliki rentang resistivitas rendah berkisar 1,2-24 Ωm dan rentang chargeabilitas tinggi berkisar 8-65 msec pada kedalaman 5-15 meter. Zona air tidak tercemar memiliki rentang resistivitas rendah berkisar 1,2-48 Ωm dan rentang chargeabilitas rendah berkisar 0-6 msec. Zona intrusi batuan beku memiliki rentang resistivitas tinggi sebesar $\geq 192 \Omega m$ dan rentang chargeabilitas rendah berkisar 0-6 msec. Pencemaran air disebabkan oleh kontaminasi zat sulfur dan diduga akibat adanya kolam limbah eksplorasi panas bumi di sebelah timur area penelitian yang menyebar melalui media air sungai ke daerah utara dan barat yang memiliki elevasi lebih rendah.

Kata kunci: Pencemaran air tanah, Polarisasi Terinduksi, Dieng, resistivitas, chargeabilitas

ABSTRACT

IDENTIFICATION AND ANALYSIS OF GROUNDWATER CONTAMINATION ZONE USING INDUCED POLARIZATION METHOD IN DIENG AREA, CENTRAL JAVA

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Water is one of the natural resources on Earth that is highly needed by humans and can be very detrimental to life if polluted. In Dieng, Central Java, residents were experiencing water pollution. As the geothermal exploration activities in Dieng have developed, residents have complained that well water has become cloudy and smelly. This has caused the residents to be unable to meet their daily needs with the well water around their homes and to turn to water from Mount Prau. Research to determine groundwater pollution used the Induced Polarization method with a dipole-dipole configuration and a total of 9 lines. The distance between electrodes is 10 meters with a repetition factor of 6. Local geological mapping conducted during acquisition, along with well information from residents, serves as supporting data for this research. The processing results are divided into three regions: west, north, and east. The western region shows that the polluted water zone is identified in the resistivity range of 1.2-24 Ωm and chargeability in the range of 8-30 msec. In the northern region, the polluted water zone is identified in the resistivity range of 1.2-18 Ωm and chargeability in the range of 8-65 msec. Lastly, the eastern region is identified in the resistivity range of 2.9-24 Ωm and chargeability in the range of 8-53.5 msec. Based on the data processing in all research areas, it was found that the groundwater pollution zone has a low resistivity range of 1.2-24 Ωm and a high chargeability range of 8-65 msec at a depth of 5-15 meters. The non-polluted water zone has a low resistivity range of 1.2-48 Ωm and a low chargeability range of 0-6 msec. The intrusive igneous rock zone has a high resistivity value of $\geq 192 \Omega\text{m}$ and a low chargeability range of 0-6 msec. Water pollution is caused by sulfur contamination and is suspected to be due to the existence of a geothermal exploration waste pond to the east of the study area, which spreads through river water media to the northern and western regions that have lower elevations.

Keywords: Groundwater contamination, Induced Polarization, Dieng, resistivity, chargeability