

GEOLOGI DAN ESTIMASI SUMBERDAYA ENDAPAN NIKEL LATERIT
MENGUNAKAN METODE *NEAREST NEIGHBOR* DAN *INVERSE DISTANCE*
WEIGHTED BLOK CSW1A

DAERAH WEDA, KABUPATEN HALMAHERA TENGAH

PROVINSI MALUKU UTARA

SARI

Daerah Halmahera Tengah, Maluku Utara terdapat kelompok batuan ultrabasa, salah satunya jenis batuan peridotit. Batuan peridotit merupakan salah satu ciri adanya keterdapatan unsur Ni, yang menjadi nilai komoditas tinggi untuk saat ini di Indonesia. Kajian mengenai kondisi geologi daerah penelitian, karakteristik geokimia, jenis batuan, pengkayaan unsur, dan model estimasi daerah tersebut sangat diperlukan dalam menggali potensi nikel laterit daerah tersebut. Topik utama yang dilakukan dalam penelitian adalah pemodelan dan estimasi menggunakan Metode *Nearest Neighbor* (NN) dan *Inverse Distance Weight* (IDW) yang didukung dengan kondisi geologi daerah penelitian. Kajian geologi yang dilakukan berupa analisis petrografi, dan analisis X-ray *Fluorescence* (XRF). Tujuan utama penelitian untuk mengetahui model dan estimasi sumberdaya endapan nikel laterit sehingga memudahkan dalam melakukan penambangan serta dapat memperkirakan batas-batas penambangan berdasarkan hasil pemodelan dan estimasi sumberdaya. Selain itu, penelitian yang dilakukan bertujuan untuk membandingkan hasil dari dua metode yaitu *Nearest Neighbor* (NN) dan *Inverse Distance Weight* (IDW), kecenderungan dua hasil estimasi akan didapatkan pengaruh jarak terhadap suatu *block* estimasi. Data yang digunakan dalam pemodelan dan estimasi sumberdaya nikel laterit terdiri dari Data *Collar*, Data *Assay*, dan Data *Survey*. Metoda Pengolahan dan analisa data menggunakan grid sebesar 12,5M x 12,5M dengan tebal *block* 2M, serta kondisi unsur yang diestimasi berupa Ni, Fe dan MgO. Hasil estimasi sumberdaya terhadap kedua metode didapatkan metode *Inverse Distance Weight* (IDW) menunjukkan total tonase zona limonit sebesar 408.812 ton dengan rata-rata kadar Ni 1.11%, Fe 34.56%, dan MgO 4.23% serta zona saprolite sebesar 841.844 on dengan rata-rata kadar Ni 1.73%, Fe 21.81%, dan MgO 17.25%. Sedangkan, hasil estimasi sumberdaya Metode *Nearest Neighbor* (NN) dengan total tonase zona limonit sebesar 408,812 ton dengan rata-rata kadar Ni 1.11%, Fe 34.55%, dan MgO 4.16% serta zona saprolit sebesar 841.844 on dengan rata-rata kadar Ni 1.75%, Fe 21.71%, dan MgO 17.56%. Hal lain yang didapatkan bahwa metode NN memiliki hasil estimasi sama dengan titik bor terdekat. Sedangkan pada metode IDW masih memperhatikan arah persebaran kompositnya.

Kata Kunci: Nikel laterit, Pemodelan, Estimasi Sumberdaya, Metode IDW dan NN, Maluku Utara

GEOLOGY AND RESOURCE ESTIMATION OF NICKEL LATERITE DEPOSITS

USING NEAREST NEIGHBOUR METHOD

AND INVERSE DISTANCE WEIGHTED METHOD FOR BLOCK CSWIA

WEDA AREA, CENTRAL HALMAHERA DISTRICT

NORTH MALUKU PROVINCE

ABSTRACT

The Central Halmahera region of North Maluku contains ultrabasic rock groups, one of which is the peridotite rock type. Peridotite rock is one of the characteristics of the presence of Ni element, which is a high commodity value for now in Indonesia. Studies on the geological conditions of the study area, geochemical characteristics, rock types, element enrichment, and estimation models of the area are needed to explore the potential of nickel laterite in the area. The main topic of the research is modeling and estimation using the Nearest Neighbor (NN) and Inverse Distance Weight (IDW) methods, supported by the geological conditions of the study area. Geological studies are carried out in the form of petrographic analysis, and X-ray fluorescence (XRF) analysis,. The main objective of the research is to determine the model and resource estimation of nickel laterite deposits to facilitate mining and to estimate mining boundaries based on the results of modeling and resource estimation. In addition, the research conducted aims to compare the results of two methods, namely Nearest Neighbor (NN) and Inverse Distance Weight (IDW). The tendency of the two estimation results will determine the effect of distance on a block estimate. The data used in modeling and estimating nickel laterite resources consists of collar data, assay data, and survey data. The data processing and analysis method uses a grid of 12.5 m x 12.5 m with a block thickness of 2 m, and the estimated elemental conditions are Ni, Fe, and MgO. The results of resource estimation of the two methods obtained by the Inverse Distance Weight (IDW) method show the total tonnage of the limonite zone of 408,812 tons with an average grade of Ni 1.11%, Fe 34.56%, and MgO 4.23% and the saprolite zone of 841,844 ounces with an average grade of Ni 1.73%, Fe 21.81%, and MgO 17.25%. Meanwhile, the resource estimation results of the Nearest Neighbor (NN) method show a total tonnage of the limonite zone of 408,812 tons with an average grade of Ni 1.11%, Fe 34.55%, and MgO 4.16% and the saprolite zone of 841,844 tons with an average grade of Ni 1.75%, Fe 21.71%, and MgO 17.56%. Another thing that is obtained is that the NN method has the same estimation results as the location of the drill points. While the IDW method still pays attention to the direction of the composite distribution,.

Keywords: Nickel Laterite, Modeling, Resource Estimation, IDW and NN Method, North Maluku