ABSTRAK

PEMODELAN DAN ESTIMASI SUMBERDAYA ENDAPAN NIKEL LATERIT DENGAN METODE *ORDINARY KRIGING* DAN *SEQUENTIAL GAUSSIAN SIMULATION* PADA IUP PT. X DI DAERAH BAHODOPI KABUPATEN MOROWALI PROVINSI SULAWESI TENGAH

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Penelitian ini bertujuan untuk membangun blok model tiga dimensi penyebaran endapan nikel laterit, menghitung sumberdaya endapan nikel laterit serta menentukan metode mana yang lebih baik berdasarkan perbandingan hasil perhitungan kedua metode geostatistik. Metode yang digunakan dalam penelitian ini yaitu metode *Ordinary Kriging* dan *Sequential Gaussian Simulation*. Daerah penelitian terletak pada IUP PT. X di daerah Bahodopi, Kabupaten Morowali, Provinsi Sulawesi Tengah. Daerah penelitian memiliki luas sekitar 247, 63 hektar dengan jumlah titik bor sebanyak 870.

Topografi daerah penelitian berupa morfologi bergelombang dan berbukit bergelombang. Batuan dasar yang terdapat pada daerah penelitian berupa batuan ultramafik dengan jenis harzburgit. Struktur geologi berupa kekar dan sesar yang diperkirakan dengan orientasi baratdaya-timurlaut. Kondisi geologi ini mengontrol penyebaran kadar nikel laterit pada daerah penelitian, hal tersebut dibuktikan dengan hasil analisis semivariogram pada metode ordinary kriging memiliki panjang 43,60 m dengan arah N 45 E. Sedangkan, pada metode *sequential gaussian simulation* memiliki panjang 39,53 m dengan arah N 45 E. Berdasarkan analisis semivariogram dari kedua metode tersebut memiliki arah orientasi yang sama dengan kondisi geologi yaitu baratdaya-timurlaut.

Hasil perhitungan sumberdaya endapan nikel laterit dengan *cut off grade* 1,3 % Ni dan densitas 1,6 Kg/m^3 pada metode *Ordinary Kriging* sebesar 13.310 ton dengan kadar rata-rata 1,49% Ni dan nilai variansi 0,31. Sedangkan, pada metode *sequential gaussian simulation* estimasi sumberdaya yang didapatkan sebesar 15.210 ton dan dengan kadar rata-rata 1,51 % Ni dan nilai variansi 0,26. Dari hasil uji signifikansi pada kedua metode dengan menggunakan taraf signifikansi 5 % kedua metode tersebut tidak terdapat perbedaan signifikan. Pada taraf signifikansi 10 % terdapat perbedaan signifikan antar kedua metode. Berdasarkan nilai koefisien variansi, variansi dan *standard error mean* metode *sequential gausian simulation* memiliki nilai yang lebih kecil dibandingkan dengan metode *ordinary kriging*, sehingga metode *sequential gaussian simulation* memberikan hasil yang lebih baik dibandingkan dengan metode *ordinary kriging*.

Kata kunci: Endapan nikel laterit, geostatistik, estimasi sumberdaya, ordinary kriging, sequential gaussian simulation.

ABSTRACT

MODELLING AND RESOURCES ESTIMATION OF NICKEL LATERITE DEPOSIT BY MEANS OF ORDINARY KRIGING AND SEQUENTIAL GAUSSIAN SIMULATION METHOD ON PT. X IN BAHODOPI DISTRICT OF MOROWALI IN CENTRAL SULAWESI PROVINCE

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This research aims to build a three-dimensional block model of the spread of nickel laterite deposit, calculate resources of nickel laterite deposit and determine which method is better based on the comparison of the results of two geostatistic methods. The method used in this research that the Ordinary Kriging and Sequential Gaussian Simulation. The research area is located on the PT. X in Bahodopi District of Morowali in Central Sulawesi Province. The research area has an area of around 247, 63 hectares by the number of drill point 870.

Topography research areas such as undulating and undulating hilly morphology. Bedrock of the research area in the form of ultramafic rocks with harzburgit types. The geological structure in the form of joint and fault estimated by the southwest-northeast orientation. This geological conditions to control the spread of laterite nickel levels in the study area, this is evidenced by the results of the semivariogram analysis on the method of ordinary kriging has range 43,60 m with a direction N 45 E. Meanwhile, the sequential gaussian simulation method has a range of 39.53 m with a direction of N 45 E. Based semivariogram analysis of the two methods has direction orientation similar to the geological conditions are southwest-northeast.

The results of the resources estimation nickel laterite deposit with cutt-off grade 1,3 % Ni and specific gravity 1,6 Kg/m^3 by means of Ordinary Kriging method is 13.310 tonnes with average grade is 1,49 % Ni and the variance is 0,31. Whereas, the method of Sequential Gaussian Simulation resources that the estimate is 15.210 tonnes with average grade is 1,51 % Ni and the variance is 0,26. From the results of significance test on both methods using a significance level of 5 % and 10 %, it was found that the significance level of 5 % both methods are no significant differences. At the 10 % significance level there are significant differences between the two methods. Based on the value of the coefficient of variance, variance value and value standard error of the mean of the two methods, simulation gausian sequential method has a smaller value than the ordinary kriging method. Then the sequential gaussian simulation method gives better results than the ordinary kriging method.

Keyword: Nickel laterite deposit, geostatistic, resources estimation, ordinary kriging, sequential gaussian simulation.