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Abstract Index

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Distribution and Characteristics of Ultramafic Rocks as Potential Nickel Laterite and Their Relation to Carbon Storage in Sorowako Region

Sebaran dan Karakteristik Batuan Ultramafik sebagai Potensi Nikel Laterit Serta Kaitannya dengan Penyimpanan Karbon pada Daerah Sorowako

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Ultramafic rocks, as the main raw material for the formation of nickel laterite in nature, are important object to study and explore for their availability since nickel is very important mineral in producing batteries for electric cars which is expected to reduce carbon emissions in the future. Along with that, the storage of carbon dioxide in ultramafic rocks is considered as one of the safest storage method because carbon dioxide reacts naturally with magnesium-rich minerals contained in these rocks. The reaction between carbon dioxide and magnesium-rich minerals such as olivine, pyroxene, and serpentine will produce magnesite ($MgCO_3$), which is more stable in nature. Ultramafic rocks have wide distribution in southeastern arm of Sulawesi Island, especially in Sorowako and the surrounding areas. The method used in this research is an observation method on outcrops and supported by laboratory analysis. Ultramafic rocks in Sorowako area have wide distribution and have varying degrees of serpentinization. The magnesium (Mg) element contained in the research area is widely spread as well as the development of geological structure allows the potential development of ultramafic rocks as carbon storage.

Keywords: ultramafic rocks, nickel laterite, carbon capture, Sorowako, Sulawesi

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Estimation of Post-Mining Guarantees for PT. X's Mineral Rock Mining Operations in Manokwari Regency

Estimasi Jaminan Pascatambang Usaha Pertambangan Mineral Batuan PT. X di Kabupaten Manokwari

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PT. X is one of the companies in Manokwari that is engaged in rock mining. Currently, the company has conducted a feasibility study and has progressed to the production operation stage. Any company that aims to upgrade its license from an Exploration Mining Business License (IUP) to a Production Operation License is required to prepare a post-mining plan document, which includes post-mining financing. The amount of this financing will be deposited in a bank as a post-mining guarantee to the government. This study aims to estimate the amount of the post-mining guarantee that will be deposited on behalf of the government. To achieve this objective, the study employs an applied research method by referring to the Minister of Energy and Mineral Resources Decree No. 1827 K/30/MEM/2018. The results of this study show that the post-mining guarantee consists of direct costs amounting to IDR 92,750,110 and indirect costs amounting to IDR 15,303,768, resulting in a total post-mining cost of IDR 108,053,878 to be deposited. Based on these findings, the post-mining guarantee will not be fully paid at once, but will be divided into three installments: in the first year, IDR 55,242,545 will be deposited, followed by IDR 33,891,302 in the second year, and IDR 23,102,571 in the third year.

Keywords: post-mining guarantee, production operations, direct and indirect costs

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Calculation of Fuel Consumption in HD 465-7R Using Engine RPM Method and Approach Per Segment at Mining Industry in East Kalimantan

Perhitungan Konsumsi Bahan Bakar pada HD 465 - 7R menggunakan Metode RPM Mesin dan Pendekatan Per Segment pada Perusahaan Pertambangan di Kalimantan Timur

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Fuel is usually used by engines to move or do work. In this article, the machine is a mining industry vehicle with the code HD 465 – 7R type from the Komatsu company. The vehicle is used to move overburden material from the loading area to the disposal area. Fuel consumption is usually influenced by several factors, the most influential of which are the slope of the road, the type of material used for the road, and the distance from the loading place to the dumping place. There are several methods are used to calculate fuel consumption, the most familiar of which is the vehicle working hours (hour meter) method. In this research, the calculation of fuel consumption uses engine RPM with a segment approach method taken with a segment distance of between 100 - 200 meters. The results of calculating fuel usage on the HD 465 – 7R have a figure of 51.7 liters/hour, with the actual value being 51.9 liters/hour. The conclusion of this research is that by using the engine RPM method, the results of fuel usage calculations are also close to the actual values. Testing by RPM with an hour meter is very different, where testing by RPM is based on the length of duration at that RPM number; the higher the RPM and the longer the duration of time, the greater the fuel released. This is continuous with the road segment, where an uphill road

segment will definitely increase travel time due to a decrease in speed, and the RPM will increase.

Keywords: fuel, fuel consumption, RPM machine, segment

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Global Critical Mineral Review and Challenges on Its Exploration in Indonesia
Review Mineral Kritis Global dan Tantangan Eksplorasinya di Indonesia
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Global critical minerals will highlight critical minerals such as lithium, cobalt, rare earth elements (REEs) and nickel that are critical in the clean energy transition. The analysis also covers the distribution of critical minerals in different regions of the world, including Europe, Africa, the Middle East, and Asia. It also discusses challenges in the extraction and processing of critical minerals and implications for sustainable exploration practices. The method used was a literature review of journals. The results show that countries such as Australia, the Democratic Republic of Congo, and China have significant critical mineral reserves. However, the African continent also has great potential in providing critical minerals needed for the clean energy transition. Therefore, emphasizing the importance of securing a reliable supply of critical minerals to support industrial and technological ambitions. In conclusion, then, with Australia, China, and Africa as major providers of clean energy, the provision of critical minerals such as nickel, lithium, cobalt, and REEs is essential for the clean energy transition and to control processes and reduce production costs, improve geological data and laboratory facilities for analysis are required. Indonesia has significant reserves for the global transition to clean energy and technological advancement. Hence, it is strategically positioned in the global mineral market as it becomes a focal point for geopolitical competition, especially between major powers. The regulatory framework in Indonesia can be complex and can pose challenges for foreign investment to enter, so addressing these challenges through increased research and regulatory alignment will be critical to unlocking Indonesia's abundant REE resources and meeting global demand.

Keywords: potential, critical minerals, global REE, geology, exploration, minerals

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Heavy Oil from Catalytic Cracking of Polypropylene-Low Density Polyethylene Plastic Waste Pyrolysis Oil to Improve the Quality of Lignite
Pemanfaatan Minyak Berat Hasil Perengkahan Katalitik Minyak Plastik Polypropylene-Low Density Polyethylene untuk Meningkatkan Kualitas Lignit
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The most obvious characteristics of lignite are its high moisture content (30-50%) and relatively low calorific value compared to other types of coal. This causes low combustion efficiency, making it not optimal for use as fuel. In this study, the slurry dewatering process was applied to coal that has a low calorific value of 3,662 cal/g and a moisture content of 37.29%. The addition effect of heavy oil from catalytic cracking of Polypropylene-Low Density Polyethylene (PP/LDPE) plastic waste pyrolysis oil on improving quality of lignite was investigated in this study. Heavy oil was used as additive. The ratio of 120 mesh lignite to heavy oil used was 100:15, 100:30, 100:45, 100:60, 100:75, and 100:90 (g/mL). Coal was carried out with a slurry dewatering process in an autoclave at various temperatures of 140 and 150 °C for 60 min. The test results obtained the highest calorific value of 6,374 cal/g and the moisture content of 2.81% for a ratio of lignite to heavy oil of 100: 45 g/mL at a temperature of 140 °C.

Keywords: lignite; heavy oil; PP/LDPE; slurry dewatering; moisture; calorific value