

Analysis of the Success Rate of Mine Reclamation at PT Mega Multi Energi, Teweh Baru District, North Barito Regency, Central Kalimantan Province

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ABSTRACT

Coal mining is an activity that contributes to environmental degradation; consequently, reclamation during the production phase must be carried out and is a regulation that must be complied with by every holder of a Mining Business License (IUP) or a Special Mining Business License (IUPK) when the mining business license area enters the post-mining phase. This study aims to analyse the success rate of mine reclamation at PT Mega Multi Energi during the period 2015–2019, as explained in the Minister of Energy and Mineral Resources Decree No. 1827 K/30/MEM/2018, Appendix VI. The method employed was quantitative descriptive analysis through field observations and a comparison of planned versus actual data. The research results indicate that the total reclamation success score, based on the weighting of Matrix 17 in Appendix VI of the Minister of Energy and Mineral Resources Decree No. 1827 K/30/MEM/2018, falls into the "moderate" category with a final score of 62%. This comprises land management, which scored 43.4 out of a possible 60; revegetation, which scored 10 out of 20; and final completion, which had the lowest score of 8.5 out of 20. It is recommended that Mining Business License holders carry out improvements in land management areas, construct erosion control structures, plant cover crops, optimise fertilisation, and increase the number of seedlings.

INTRODUCTION

Mining in Indonesia, particularly coal mining, is a pillar of the Indonesian economy, especially in Central Kalimantan Province. However, open-pit mining activities pose significant challenges regarding negative environmental impacts, such as changes in land morphology, soil quality degradation, and the potential for acid mine drainage (Afrianti, 2020; Fitriyani, 2016). As a mitigation measure, land reclamation is an absolute obligation for every holder of a mining business licence, as stipulated in Government Regulation No. 78 of 2010 and reaffirmed by the Minister of Energy and Mineral Resources Decree No. 1827 K/30/MEM/2018, with the aim of improving and restoring mining areas and rehabilitating the ecosystems of former mining sites so that land functions can be optimised once again (Ramadhanu, 2025)

The implementation of reclamation is not only about land management, revegetation, and canopy cover activities. Rather, assessments and evaluations must be carried out in accordance with applicable regulations. Previous research by Putrawiyanta et al. (2026) showed that land-use achievements in the initial stages are often hampered by a shortage of topsoil. In line with this, Sitompul (2025), in a study analysing the success rate of reclamation of former coal mining sites in the western pit of PT Wahyu Murti Garuda Kencana, found that the alignment between plans and implementation is highly dependent on land readiness and the availability of planting

seedlings. However, independent evaluation is often neglected, meaning that compliance with regulations needs to be reassessed.

PT Mega Multi Energi is a coal mining company in North Barito Regency, Central Kalimantan Province, and has carried out reclamation during the production phase since 2010. PT Mega Multi Energi has complied with and fulfilled the requirements for the Reclamation Plan (RR) and the preparation of the RKL-RPL, but has not yet carried out an independent evaluation of the percentage success rate of mine reclamation based on relevant regulatory parameters. Against this background, an analysis of the success rate of mine reclamation was undertaken with the aim of providing useful information to evaluate the company's reclamation performance and its compliance with government regulations.

RESEARCH METHODS

This study focuses on reclamation activities carried out between 2015 - 2019 at PIT BB01 of PT Mega Multi Energi. The research method employed is a quantitative descriptive approach. Data collection was carried out using a Monitoring Design (R.M.) approach. Primary data were collected through field observations, which included direct observation and measurement of the reclamation area; interviews were conducted over 30 working days to obtain information regarding the process and challenges in implementing reclamation; documentation involved the collection of secondary data in the form of reclamation activity reports, reclamation plan documents, and maps of the forest area and reclamation site.

Data processing was carried out using scoring and weighting methods based on Matrix 16 and Matrix 17 of Appendix VI of the Minister of Energy and Mineral Resources Decree No. 1827 K/30/MEM/2018. The percentage of achievement was calculated by comparing the actual values with the planned values. Subsequently, the percentage of the evaluation score was calculated using the following equation:

$$TN = \sum_{i=1}^n \left[\frac{Ts}{sm} \times weight \right] \quad (1)$$

Notes: TN = Total marks; TS = Total criteria assessment score; SM = Maximum criteria mark (100). The final results of the calculation will be classified into the following categories: good (>80%), moderate (60-80%), or poor (<60%) in accordance with Article 16, Chapter IV of the Regulation of the Minister of Forestry of the Republic of Indonesia Number P.60/Menhut-II/2009.

RESULTS AND DISCUSSION

The reclamation work carried out by PT Mega Multi Energi covered 60.38 hectares, representing 85.79% of the planned total of 78.69 hectares. This discrepancy was due to the presence of unreclaimed areas, which included land use planning, revegetation and final completion. The reclamation area is shown in Figure 1 below:



Figure 1. PT Mega Multi Energi reclamation area for the period 2015 – 2019

Land use planning

Topsoil was spread to a depth of 35-50 cm. However, the planned erosion control structures, such as check dams and drop structures, were not constructed on site, resulting in minor erosion in the land-reclamation area. This activity was carried out using the following equipment: one PC 400 excavator; two Hino 500 trucks. (PT Mega Multi Energi, 2019).



Figure 2. Land Reclamation

Acid mine drainage management was carried out using a neutralisation method involving the addition of quicklime and alum to the second and third settling ponds, ensuring that the water quality in the discharge pond leading to the river met environmental quality standards (pH 7.28).



Figure 3. Settling pond area

Revegetation

Revegetation activities at PT Mega Multi Energi utilize only fast-growing plant species such as sengon and acacia, as well as local mango and durian trees, planted in an alternating pattern with 4 x 4 meter spacing. Overall, 19,332 trees have been established, falling short of the initial target of 47,000 trees (fast-growing plants & native plants). This was due to limited

availability of seedlings and labour during the reclamation process. Furthermore, the failure to plant cover crops increased the risk of topsoil loss due to erosion by surface runoff.

Final Completion

Maintenance activities include fertilization (using compost and MRK) across a 30.92 hectare area, weed control, and replanting. Replanting covered 100 percent of the dead plants (40 stems), but the fertilisation programme did not yet cover the entire reclamation area. This situation has resulted in a low percentage of maintenance and canopy cover in the reclamation area of PT Mega Multi Energi.

Based on field observations and validated against data from PT Mega Multi Energi reclamation plan reports for 2015-2019, a comparison of the planned and actual reclamation is presented in Table 1.

Table 1. Comparison of planned and actual reclamation

Reclamation Activities	Object of Activity	Plant	Realization	Percentage Achieved
Land Use Planning	Ground Surface	78.69 Ha	60.38 Ha	76.73%
	Arrangement Restocking of Former Mining Land	78.69 Ha	60.38 Ha	76.73%
	Soil Spreading in the Rooting Zone	78.69 Ha	60.38 Ha	76.73%
Revegetation	Erosion control	Constructed	Not Constructed	0%
	water management	Constructed	Constructed	100%
	Area of planting (cover crops)	0	0	0%
	Area of planting (fast-growing plants)	60.38 Ha	60.38 Ha	100%
	Area of planting (native plants)	60.38 Ha	60.38 Ha	100%
	Plant growth (cover crops)	0	0	0%
	Plant growth (fast-growing plants)	23,500 stems	9,666 stems	41.13%
	Plant growth (native plants)	23,500 stems	9,666 stems	41.13%
	Material management acid mine water treatment plant	Target pH achieved in accordance with BML	Target pH achieved in accordance with BML	100%
	Sediment settling pond	6 – 9	7,28	100%

Final Completion	Fertilization	60.38 Ha	30.92 Ha	51.21%	
	Weed and pest control	Carried out	Carried out	100%	1.5% (maximum 2%)
	Replanting	40 stems	40 stems	100%	

Based on the weighting of matrix 17, the results of the success evaluation are summarized in Table 2.

Tabel 2. Total Final Score of Assessment

No	Activity Description	Weight	Assessment Results
1.	Land Use Planning		
	a. Land reclamation through backfilling of post-mining areas	40	30.7
	b. Soil Spreading in the Rooting Zone	10	7.7
	c. Erosion Control and Water Management	10	5
2.	Revegetation		
	a. Planting of cover crops	2.5	0
	b. Planting of Fast-Growing Species	7.5	3
	c. Planting of Native Species	5	2
	d. Acid Mine Drainage (AMD) Control	5	5
3.	Final completion		
	a. Canopy Cover	10	3
	b. Maintenance	10	5.5
	Total	100	62

Based on Matrix 16 and Matrix 17, Appendix VI of the Minister of Energy and Mineral Resources Decree Number 1827/30/K/30/MEM/2018, the success rate of reclamation production operation at PT Mega Multi Energi falls into the '**moderate**' category with a final score of **62%**. This score indicates that the reclamation work has been carried out, but has not yet fully met the regulatory criteria. The presence of 18,31 hectares of voids that have not yet been reclaimed is one of the key factors contributing to the sub-optimal fulfilment of these regulatory criteria.

The soil pH in the reclamation area was recorded at 5.75, which is classified as good for plant growth. However, in the absence of erosion control structures and cover crops, nutrients in the topsoil layer are vulnerable to being washed away by rainwater or surface runoff, given the high average rainfall in the reclamation area (reaching 9.49 mm/month in 2016). This is consistent with the findings of Sandan (2023), who explained that the hilly topography in the IUP area requires optimal drainage and terracing designs to maintain slope stability.

This is also in line with the fact that labour constraints and sub-optimal nursery areas act as barriers to meeting the target number of plants grown. Therefore, technical and managerial improvements are essential to raise the reclamation success rate from the 'moderate' category to 'good' (>80%).

CONCLUSION

Based on the results of analysis and research, the implementation of reclamation during the production phase at PT Mega Multi Energi between 2015 and 2019 comprised three main stages, namely: land utilisation, revegetation and maintenance. However, the implementation has not yet been fully optimal or in line with the plan. The area of land successfully managed totalled 60.38 ha (76.73 percent), with the main obstacles being void areas, the absence of erosion control structures, and the lack of cover crops. The success rate of reclamation during the production phase, as assessed under Minister of Energy and Mineral Resources Decree number 1827 K/30/MEM/2018, achieved a final score of **62%**, which falls into the '**Moderate**' category.

It is recommended that PT Mega Multi Energi prioritise the planting of cover crops to control erosion, optimise in-house seedling production at the nursery to meet planting targets, and expand the area covered by fertilisation. Furthermore, the use of remote sensing technology for regular monitoring is strongly recommended to track land degradation and canopy cover in real time.

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