

Reclamation Planning on Mining Operations PT. Prima Timah Utama in Mapur Village, Bangka Regency, Bangka Belitung Province

Imam Firdaus^{1*}, Didik Susetyo², Restu Juniah³,

¹Postgraduate, Magister of Mining Engineering, Sriwijaya University, Palembang 30139, Indonesia

²Professor, Economic Department, Sriwijaya University, Palembang 30139, Indonesia

³Associate Professor, Mining Engineering Department, Sriwijaya University, Palembang 30139, Indonesia

*Corresponding author e-mail: imamfirdaus1@yahoo.co.id

Abstract

PT. Prima Timah Utama is one of the companies that received a Production Operation Mining Permit from the Bangka Regency Government in May 2014. The company has been carrying out mining activities since Mei 2014, with a maximum production level of 500,000 m³ of ore per year. This study made a field study of the impact of mining activities carried out by the company, looked at the success rate of reclamation, and calculated the ideal costs to improve environmental quality after mining activities. Reclamation planning for mining operations at PT. Prima Timah Utama is included in the type of non-experimental qualitative research conducted desktop study and field observations in the mining field. This research will analyze and make a reclamation plan based on the criteria of success of ex-mining land that is standard for sustainable mining. The results of the study show a lack of guarantee of the implementation of reclamation guaranteed by the Company to the government of $\pm 50\%$ of ideal conditions. Based on the results of the study, the company will use plants that are able to have a high level of adaptation to critical environments. One type of plant chosen is Acaciamangium. The costs needed to carry out the ideal reclamation activities to improve the quality of the environment after mining are IDR 3,642,427,321.- or IDR 65,629,324.- / hectare

Keywords

tin, reclamation, reclamation guarantee, Acaciamangium

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1. INTRODUCTION

Indonesia is a country which rich in mineral resources with one of them being tin. Based on data released by the Indonesia Mining Association in 2009, shows that tin content in Indonesia is the second largest in the world (Kristian, 2016). Therefore, many companies are engaged in the tin mining industry, one of them is PT. Prima Timah Utama in the Province of Bangka-Belitung. Each mining activity will have two sides, in the form of positive and negative impacts. The positive impact will arise in the form of improving the economy of the community around the mine due to the absorption of labor and the opportunity to open new jobs such as buying and selling services, and others. Without denying the negative impacts will arise as a result of mining activities in the form of losses to the environment (Juniah et al., 2016). Environmental losses arising in the form of chemical, biological, and physical changes in the ex-mining land. Therefore, according to Adi et al. (2017) a planned reclamation activity is needed in an effort to overcome the negative impacts of activities. Reclamation activities take place during the mining process to post-mining. The purpose of reclamation activities is to restore

the environmental conditions of the former mining sites as before or to be more productive, so that it is expected to produce environmental and sustainable added values for the present and future generations according to their designation (Munir and D, 2017; Suparmoko, 2006). The biophysical, environmental, social and economic aspects of the community must be considered in carrying out reclamation activities in order to be able to reduce the negative impacts of tin mining (Asmarhansyah and R, 2017). This is because the economic, social and environmental balance in the mining sector is a goal for achieving sustainable mining activities (Juniah, 2018).

Juniah mentions, reclamation stages include topsoil conservation, cover crop planting, pioneering crop planting, heavy metal countermeasures (Juniah, 2017). Landscape changes that occur as a result of mining activities can be permanent (for example deep undersea soil, changes in soil bodies, and loss of biodiversity) or temporary (for example, dumps of remaining excavation and tailings), so that conducting reclamation activities requires different approaches and technologies (Dariah et al., 2010).

PT Prima Timah Utama as a company that conducts mining activities is obliged to carry out reclamation and post-mining activities as stipulated in Government Regulation No. 78 of 2010 and Ministerial Regulation No. 7 of 2014. Reclamation activities are an act to organize, restore, and improve the environment so that it can function in accordance with its uses carried out throughout the mining business phase (ESDM, 2014). PT Prima Timah Utama in planning its reclamation activities will carry out revegetation activities with the selected plant species being acacia (*Acaciamangium*).

Legislation related to mining requires mining companies to reclaim the Mining Business Permit Area that they seek. This reclamation activity can be carried out throughout the mining business phase and continues after the end of some or all activities. The company is required to deposit reclamation guarantees through joint accounts between the Government and the Company as a form of seriousness towards reclamation activities. Reclamation guarantees must be placed before the company conducts production operations for the first five-year period, and continues for the next five years.

Determination of the components of reclamation costs refers to Government Regulation No. 78 of 2010, namely: (a) Direct costs include costs for land administration, revegetation, prevention and control of acid mine drainage, civil works in accordance with the designation of post-mining land; and (b). Indirect costs include the cost of mobilization and demobilization of equipment, reclamation planning, administration, and supervision. Reclamation guarantees must be provided by holders of Mining Business Permits and special mining business licenses consisting of a reclamation guarantee for the exploration phase and reclamation guarantee for the production operation stage. The obligation to implement reclamation activities by holders of Mining Business Permits and special mining business licenses will not be lost despite the placement of reclamation guarantees to the government (Pohan and Anwar, 2014). The calculation of the amount of reclamation collateral for the planned reclamation activities must be calculated as accurately as possible aims to the planned reclamation plan can run well so that the sustainable environment expected by all parties can be achieved.

2. EXPERIMENTAL SECTION

2.1 Materials

Administratively the location of the mining operation permit for the production operation is in the Cit Village of Riau Silip Sub-District, Bangka Regency, Bangka Belitung Province with the area of the mining business license, the production operation is 58.7 hectares. The prime mining business license area of PT Prima Timah Utama can be reached by using two- or four-wheeled vehicles from the capital city of Pangkal Pinang for approximately 80 kilometers. The condition of road access using relatively good asphalt and yellow soil, provincial and district roads are concrete and asphalt road classes with a width of 4 meters, district road access that connects the location with the provincial road have a road width of 3 meters.

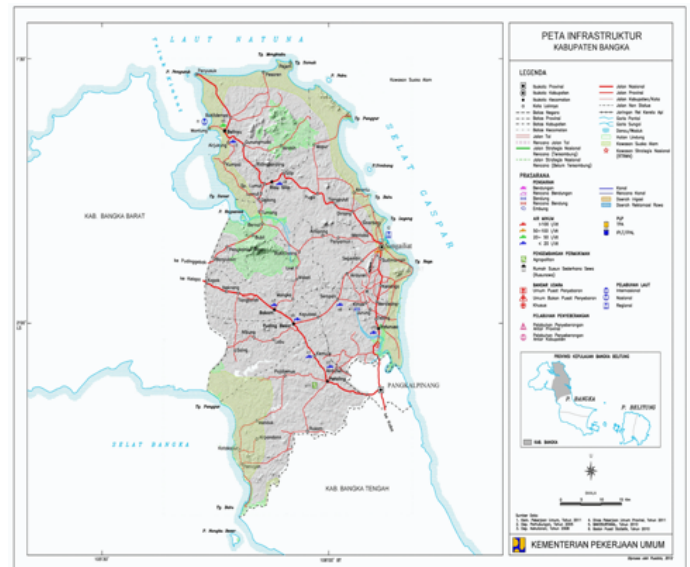


Figure 1. Map of Research Location

The data needed in this study are primary data and secondary data. Primary data to be taken directly include:

1. Initial condition for areas that have not been mined.
2. Technical tin mining carried out by the company.
3. Efforts made by the company related to environmental protection
4. The success rate of reclamation results in the previous stage, measured by the percentage of success.
5. Comparison between reclamation plans and actual conditions that include area, type of plant, growth rate, and others.
6. The amount of reclamation guarantees that has been submitted for the first five year period.

Secondary data needed, including:

1. Company environmental studies which include analysis of environmental impacts documents, Post-Mining Plans, and Reclamation Plans for the first five-year period.
2. Documents or regulations related to reclamation success criteria.
3. Evaluation report of the success of the first five-year reclamation stage
4. Study results with relevant agencies including the Office of Energy and Mineral Resources of Bangka Regency and Bangka Belitung Province.

2.2 Method

Reclamation planning for mining operations at PT. Prima Timah Utama is included in the type of non-experimental qualitative research conducted on a desktop study basis and field observations in the mining sector. This research will analyze and make a reclamation plan based on the criteria of success of ex-mining land that is ideal for sustainable mining.

3. RESULTS AND DISCUSSION

3.1 Initial Environmental Scope

The initial environmental tone is a description of the state of the environment around the location of the planned activity. Based on observations in the field, the type of vegetation found around the location of the activity is generally secondary forest area and scrub vegetation.

The types of fauna found in the location around the activity are still found in many types of birds including Pipit, Punai, Perbak, Tekukur, Kutilang, and others. Reptile animals found around the planned activity location based on field survey observations and community information are snakes, lizards and monitor lizards. While the types of mammals that are found around the location include civets, bats, and pigs.

Residents around the mine site consist of Malays, Palembang, Javanese, and ethnic Chinese with a majority Islamic religion and a small percentage of Christians, Buddhists, and Confucians.

3.2 Mining System

Mining activities in the Production Operation Mining Permit Area of PT. Prima Timah Utama uses an open-pit mining system where mining uses a combination of loading equipment, conveyance equipment, and mine pumps to obtain dry tin sand with Sn content of 70-74%. The following is the actual and planned ore production from PT. Prima Timah Utama from the estimated total reserves of 3,300,000 m³.

Table 1. Plans and Actual Production of PT. Prima Timah Utama Period 2014 - 2018

No	Year	Production Plan (m ³)	Actual Production (m ³)
1	2014	350,000	321,200
2	2015	500,000	487,500
3	2016	500,000	497,320
4	2017	500,000	486,211
5	2018	500,000	-
Total		2,350,000	1,792,231

3.3 Reclamation Activities

Ex-mine land PT. Prima Timah Utama has been reclaimed using a pot system, which contains a mixture of topsoil, the chemical fertilizer and compost fertilizer. The selection of plants for revegetation must consider several aspects including the suitability of plants to the land, ease of maintenance, availability of seeds, quality of crops produced and economic aspects. The choice of plant species for revegetation was chosen by acacia plants (*Acaciamangium*). This type of plant, including the type of plants that grow around the Mining Business Permit other than that, is a type of plant with rapid plant growth. The cropping pattern used in this revegetation uses a square pattern and alternating planting between other plants and acacia. The pat-

tern is intended for competition in finding nutrients between plants.

3.4 Calculation of Reclamation Guarantee Costs

Calculation of reclamation guarantee costs is divided into direct costs and indirect costs. Direct costs consist of land management costs, revegetation costs, post-mining civil works costs, and maintenance costs. Based on the calculation of direct costs for PT Prima Timah Utama reclamation activities in 2014-2018 IDR 2,914,653,977.-. The amount of indirect costs which consist of the cost of mobilization and demobilization of heavy equipment, reclamation planning, administration and supervision costs is IDR 1,211,531,064. So the total reclamation costs that must be guaranteed by the company based on the calculation for the first 5 (five) years is IDR 3,642,427,321.-.

3.5 Comparison of Reclamation Guarantees

After recalculation, there is a lack of guarantee for the implementation of reclamation guaranteed by the Company to the Government. The difference is seen in Table 2.

The above conditions can be compared by looking at the amount of reclamation costs or guarantees issued by the company. The cost calculation is an amount with a percentage of $\pm 50\%$ of the ideal condition. PT Prima Timah Utama has compiled documents and deposited reclamation guarantees for the period 2014 - 2018. The reclamation guarantee that has been paid in that period is IDR 1,847,871,160.-. This amount is still $\pm 50\%$ of the results of the calculation of this study. This study has calculated the additional funds needed by the Company to improve the quality of the environment, the additional amount is IDR 1,794,556,340.-. The additional funds are expected to make the environment that was previously a mining activity area to increase the quality of the environment after reclamation compared to the initial hue.

4. CONCLUSIONS

PT. Prima Timah Utama has made reclamation efforts in the period 2014 - 2017 with a success rate of $\pm 50\%$ of the target. The company in an effort to improve the quality of the environment after the mine will carry out revegetation activities using *Acaciamangium* trees. The ideal reclamation guarantee for PT. Prima Timah Utama based on the results of the calculation is IDR 3,642,427,321, - or as much as IDR 65,629,324, -/hectare.

5. ACKNOWLEDGMENT

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Table 2. Comparison of Reclamation Guarantees

No.	Year	Company Guarantee (IDR)	Calculation Guarantee (IDR)	Difference (IDR)
1	2014	341,433,640	415,877,100	-74,443,460
2	2015	222,617,807	346,053,000	-123,435,193
3	2016	513,403,925	292,965,300	220,438,625
4	2017	191,350,482	307,384,100	-116,033,618
5	2018	579,065,306	2,280,148,000	-1,701,082,694
	Total	1,847,871,160	3,642,427,500	-1,794,556,340

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