



# BUSINESS IMPROVEMENT CHANNEL DUMP PROJECT PIT PQRT SITE LMO

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## KeyWords

Channel dump, business improvement, DCF, AHP, business value realization, management project, distance, blending ratio, sequence accuracy, disposal compliance, coal, NPV, PI, PBP, IRR.

## ABSTRACT

Indonesia is one of the largest coal producing countries in the world, as well as being the number 7 country as a user of coal energy as the main source of energy. It is recorded that Indonesia's coal production target in 2022 is 663 million tons, with an export target of 497.3 million tons and domestic use (DMO) of 165.7 million tons. PT Berau Coal as one of the companies engaged in the coal industry business is one of the companies with the largest production capacity in Indonesia. In 2022 PT Berau Coal's total coal production target is 33 million tons. One of the sites with the largest total coal production of PT Berau Coal is the Lati Mine Operation site with a total coal production target in 2022 of 8.5 million tons.

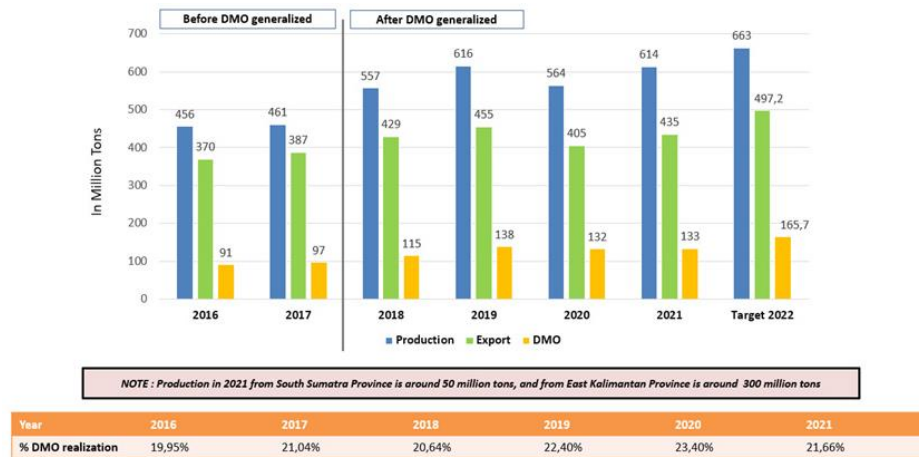
Of course, to continue to be able to increase its production capacity, it is necessary to make improvements in the existing business processes. This must still be adjusted to the actual conditions of the field and the company's vision and mission, so that the implementation of the project carried out goes hand in hand with the company's goals. The PQRT pit LMO site as one of the largest pits in the PT Berau Coal area in the process of achieving production to support the production achievements of PT Berau Coal has several challenges in the coming years. Some things that can be an obstacle to the mining process carried out include the ratio of blending materials in the disposal area, based on the results of reserving in 2022 the total soft material that needs to be handled is 33 million BCM with hard blasting material for blending only 80 million BCM, then the existing blending ratio is only 2.44 or a shortage of 1.11 from plan 3.55. Then another problem faced is related to the distance hauling overburden which is getting farther and farther towards the west area due to the development of the south towards pit and the delay in completing the western disposal (compliance disposal) so that it has an impact on existing operational costs. Based on the review of actual distance 2022, the existing distance figure is 3,039 compositely (for a total fleet of 35), while the plan for 4 fleets that will run and enter the western disposal area is 4,760 KM from the 2022 plan of 3,380 KM.

To overcome several obstacles and to achieve production targets in 2023 and beyond, a more detailed analysis is carried out related to what business improvement can be done through project management process review, business value realization to AHP analysis to determine the project to be executed and become the top priority. Based on the results of the analysis carried out, it was found that the most suitable project is the Channel Dump project. The project is a new improvement in the disposal area by applying technology for the surveillance process, dumping in the highwall area using channels and the use of steel hoppers as a sliding pad (channel) foundation.

With the implementation of the Channel Dump project and after an analysis related to the impact and benefits on K3 and operational aspects, results were obtained related to increasing the blending ratio from 2.44 to 3.4, reducing distance compositely by 25 meters (for a total fleet running of 35 units), increasing sequence accuracy from 88.9% to 91.2%, and increasing compliance disposal from 70% to 76%. Based on the results of the financial analysis study, the potential of the Channel Dump project to produce an NPV value of < 0 is 0%, with an NPV value of Rp. 2,429,003,770.83, PI 1.37, PBP 1.17 and IRR 38.15%.

**BACKGROUND**

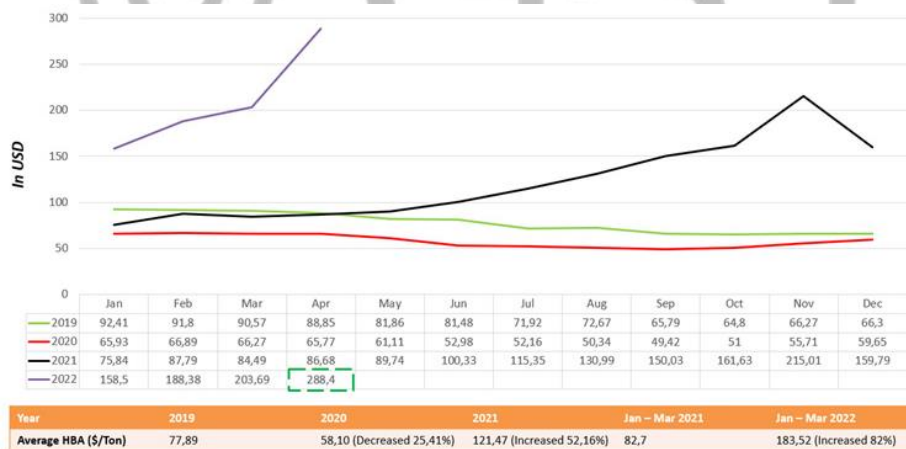
Indonesia's coal industry continues to develop both in terms of the total volume of production produced or the development of technology and innovation in the mining process. The purpose of innovation and improvement carried out is of course to improve the efficiency and effectiveness of the mining process carried out. Based on the analysis of data conducted by APBI-ICMA, there is a significant increase in the volume of production from year to year produced by Indonesian mining companies.



**Figure 1.** Indonesian Coal Production Volume

Source: APBI-ICMA

The increase in the volume of coal production produced by Indonesian coal companies goes straight with the value of coal price increases based on HBA (Reference Coal Price). In 2022 in April the price of coal reached 288.4 \$/Ton. The significant increase in coal prices in the pandemic era caused many companies to innovate and improve the process business carried out, with the aim of improving the efficiency and effectiveness of mining.



**Figure 2.** Average HBA (\$/Ton)

Source: APBI-ICMA

In 2023 and in the following years, it is planned that PT XYZ Pit XYZ will improve dumping from the top of the cliff using the Channel Dump method at a height of 30-40 meters from the bottom of the disposal, this area is planned as a soft material disposal location (mud and redisturb) with a capacity of about 2.3 Mbcm. To ensure that this method can be implemented properly, first a study is made on the design of the Channel Dump method system, starting from the design, trial until the pilot project is carried out, as well as studies in terms of K3 and other technical aspects. Based on production data in 2022, the volume of redisturb material that will be loaded is 26,812,535 BCM or 20% of the total production value of Lati Mine Operation, while for swamp material it is 6,165,510 BCM or 5% of total production. This causes the need for special improvements to handle the soft material, and one of the new improve-

ment methods applied is to use the Channel Dump method as a substitute for conventional disposal.

### Business Issue Exploration

Based on the existing mining process, there are advantages and disadvantages to using this conventional method. Some of the shortcomings include the need for different procedures and handling for each existing case, both in terms of material and storage locations. Hard material or blasting can be dumped in the disposal area with the normal method without any special treatment. Meanwhile, soft materials that are included in the mud/redisturb category cannot simply be dumped in the disposal area. This is because there is a potential for fractures/cracks and the unit will collapse when entering the disposal area if the soft material being dumped is not blended first. The flowchart below shows the dumping process in the disposal area starting from the planning stage, blasting/ripping, loading process, to hauling mud/redisturb material to the disposal area which will then be dumped. The use of this method has been applied in various mining business areas including the PT XYZ areas.

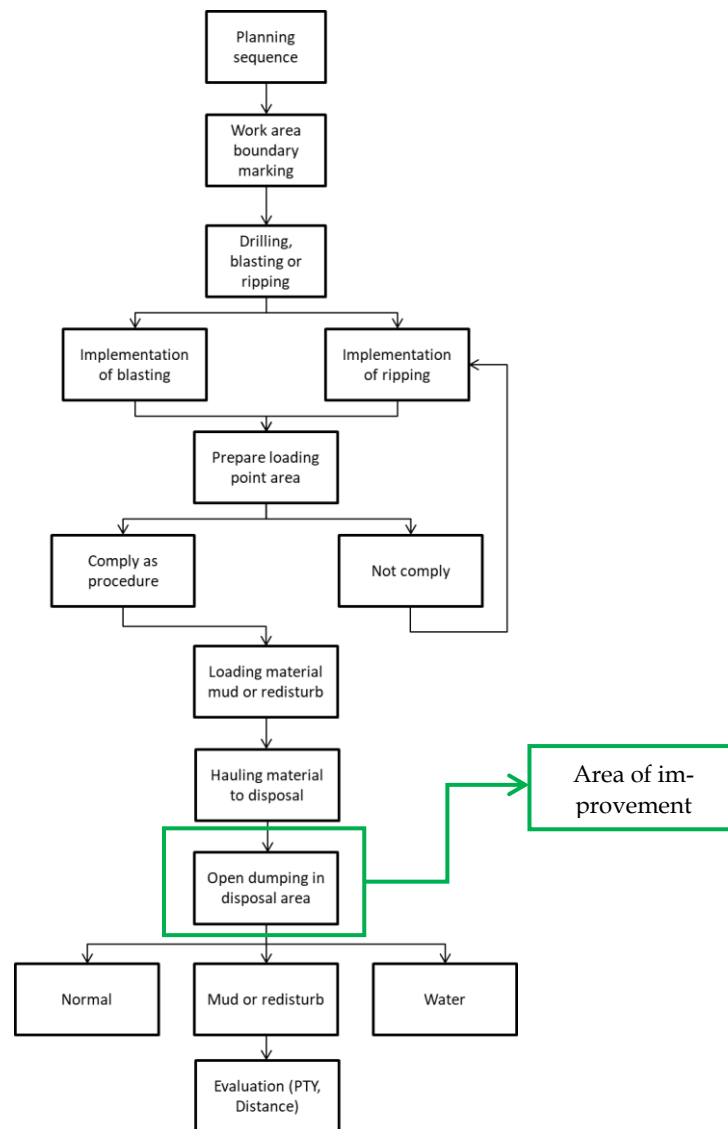


Figure 3. Conventional open dumping method in disposal area

This study will briefly describe the conventional stockpiling process in the disposal area based on the flow process handling mud/redisturb material and the area of improvement that will be carried out by applying the channel dump method. The existing

improvement areas will be determined through evaluation in terms of K3L aspects as well as the potential for an increase in production volume due to reduced distance, fuel optimization and the cycle time of the hauler unit which can increase.

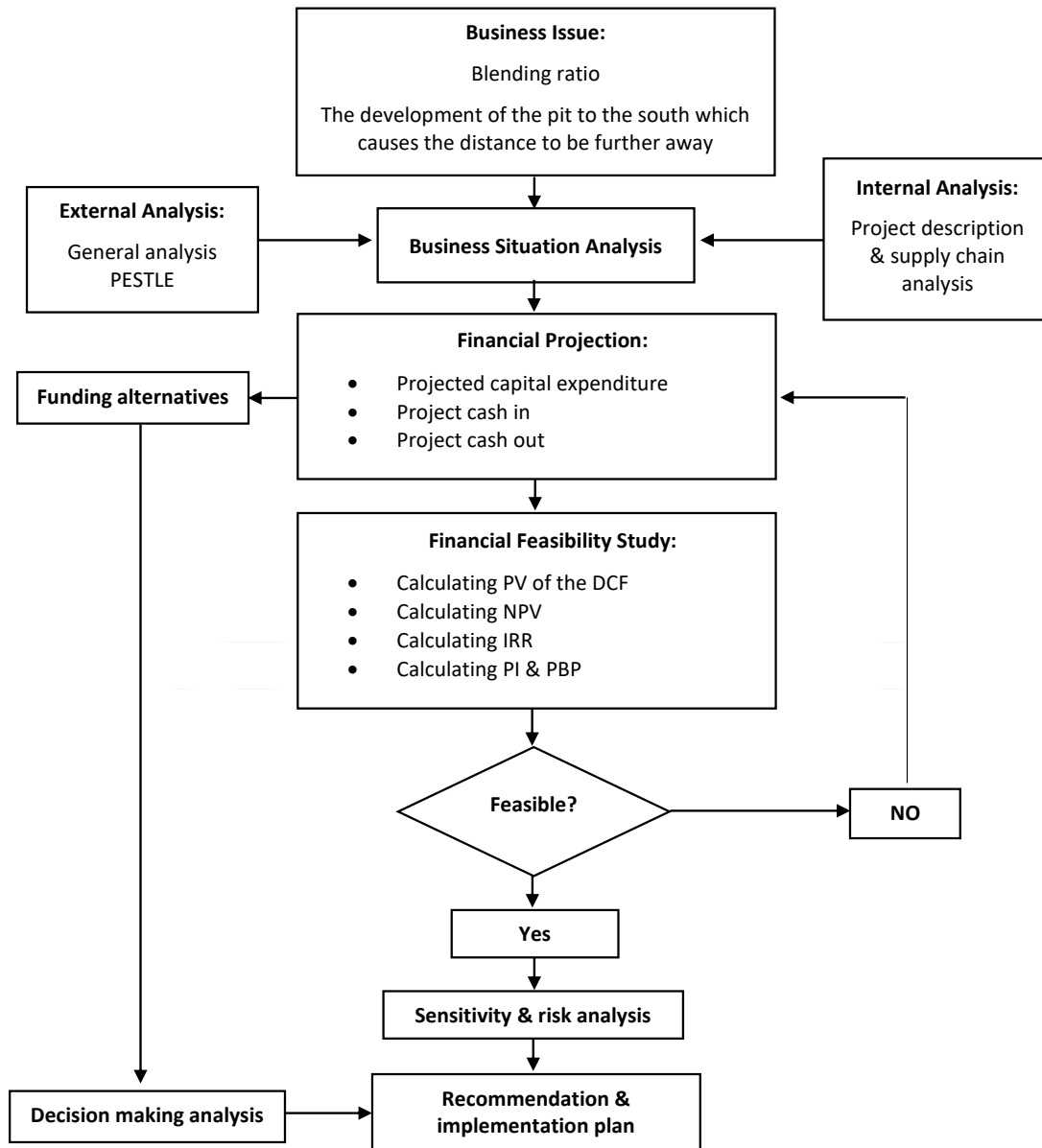


Figure 4. Research Framework

### Business Solution

In this alternative solution business sub-chapter, it will be discussed in detail about the project management process carried out for the formulation of projects that are included in PT XYZ strategy objective which will then be selected based on business value realization so that the project that will be analyzed later is indeed in accordance with the company's goals and vision and mission to achieve its targets. Based on this objective strategy, PT XYZ has 3 objective projects that will be an improvement in 2023, namely Geotextile Permanent Access, ROM Central and Channel Dump Project. In general, the description of flow process dumping in conventional disposal areas is divided into three categories, namely, normal dumping, dumping on water, and dumping swamps. The three categories have different dumping procedures and processes in terms of operations and safety. In the conventional disposal area, there will be

several activities that are likely to run simultaneously, ranging from OB material stockpiling activities, material blending activities from different areas, repairing disposal areas, to the process of forming a disposal barrier / embankment if it falls into the category of hoarding on water or swamps. The Channel Dump project, and based on the improvements made to the existing business processes, will help in reducing the need for blending materials, and can increase the level of safety during the dumping process, this is due to dumping activities that are not accompanied by other activities, such as front dumping repairs, road access repairs and material blending processes using the help of support dozers.

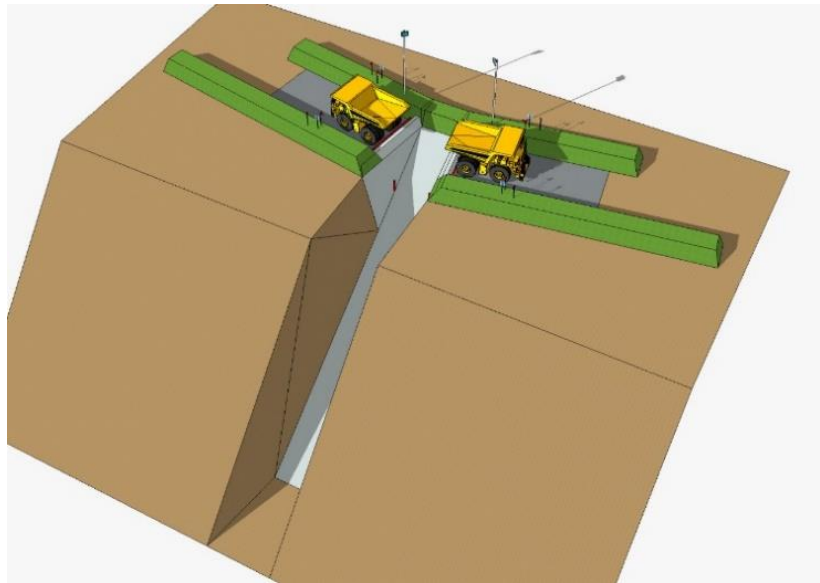
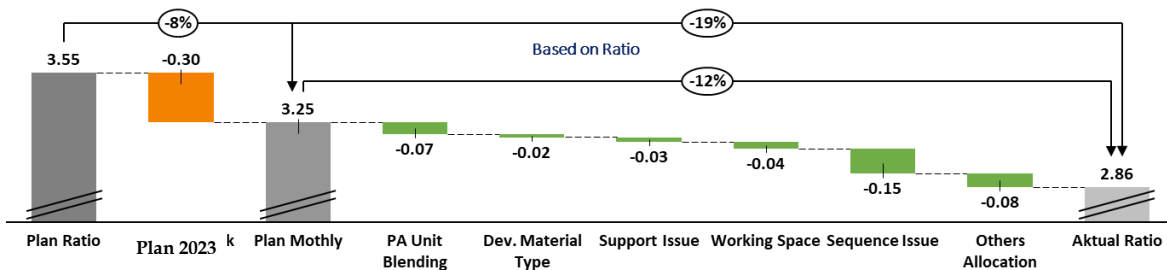


Figure 5. Channel Dump Illustration

**Result**

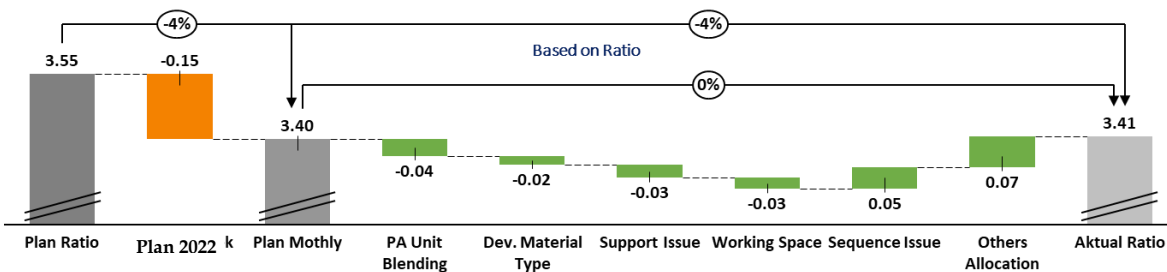
The projected increase in the blending ratio at the end of 2022 estimated at 1:2.86 is the result of calculations with mutually agreed production parameters due to a significant reduction in the total production target capacity of the PQRT Pit from 124 MBCM to 117 MBCM. Further analysis needs to be done, because based on the results of calculations and reports using the help of SPRY software, there is still a lack of blending ratio from 1:3.55 but the projection figure only reaches 1:2.86 (shortage 0.69). The following is the data from the analysis if the Channel Dump project can be implemented and has a significant impact on the needs of the blending ratio.



**Highlight:**

- Blending ratio 1 : 2.86 for PQRT area until end of year 2022 (Include Channel Dump Volume)

Figure 6. Blending Ratio Include Volume Channel Dump



**Highlight:**

- Forecasting Blending ratio 1 : 3.41 for PQRT area for 2023 (Exclude Channel Dump Volume 12 MBCM)

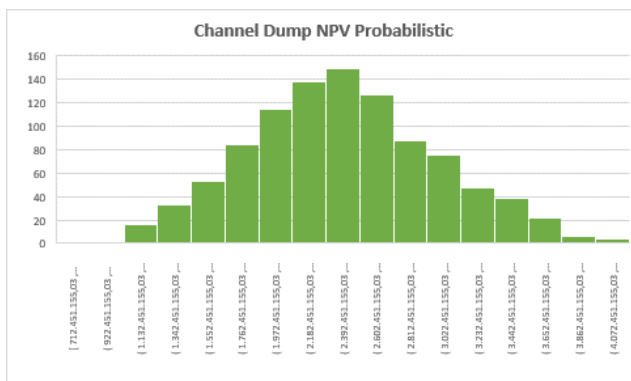
**Figure 7.** Blending Ratio Exclude Volume Channel Dump

It can be seen in the waterfall gain loss of the YTD blending ratio in 2022 until September 2022 that the blending ratio value is below the plan, with a plan of 1 : 3.59 and an actual ratio of 1 : 3.17, then after reanalysis for the projection of the blending ratio number based on material type until the end of 2022 the blending ratio figure is still far below the plan, with an ideal ratio plan of 1 : 3.4 and forecasting ratio 2022 which is 1 : 2.86. Furthermore, looking at the potential volume of mud and redisturb that can be handled without blending with the Channel Dump project which reaches a volume of 12.9 MBCM in 2023, it can be projected into the waterfall gain loss blending ratio 2023 with 12.9 MBCM not included in the total material that needs to be blended, then a blending ratio of 1 is obtained: 3.41 or is at the ideal ratio with an increase in the gain parameter in terms of sequence issue and others allocation (road & front loading).

**Table 1.** Financial Feasibility Analysis

Criteria	Result
Payback Period	1,17
Discounted Payback Period	1,35
Net Present Value	IDR 2.429.003.770,83
Profitability Index	1,37
IRR	38,15%

The results of the Financial Feasibility Analysis mentioned above show that of the 5 parameters that exist this project is very feasible to run. The first parameter related to the payback period looking at the length of the Channel Dump project process for 6 months, it can be said that the payback period on this project is quite good (2 x Project Timeline). Then the next parameter is NPV, the NPV value in this project is positive so it can be said to be feasible. Regarding the PI (Profitability Index) parameter whose value is > 1, it can be said that the PI in this project is good. The last parameter is that the IRR is far above the minimum return target received 10% (Company Policy).



**Figure 8.** Channel Dump Risk Analysis (Monte Carlo Simulation)

The results of the Monte Carlo Simulation analysis showed that the probability of the appearance of an NPV value of < 0 is 0%, so it can be said that this Channel Dump project is very feasible to do.

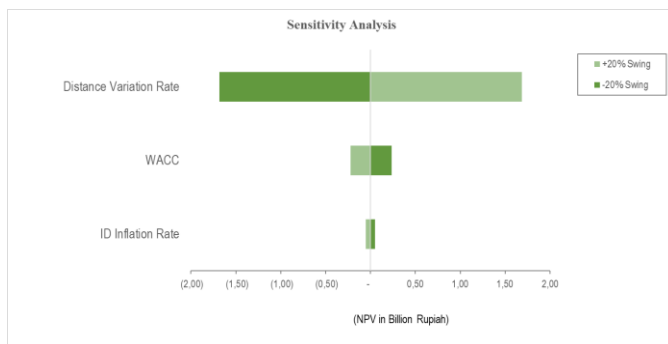



Figure 9. Sensitivity Analysis

Figure 9. shows 4 variables in this project ranging from exchange rates, distance variation rates, WACC to ID inflation rates. Based on the results of the sensitivity analysis carried out, variable exchange rates and distance variation rates are the variables that most influence the results of the financial analysis carried out in this final project.

**Conclusion**


To make it easier for the company and continue to maintain its ability to survive and continue to produce its best products, PT XYZ strives to continue to make improvements to its business processes. One of the improvement projects that will be carried out is Channel Dump. Based on the results of the analysis that has been carried out previously in Chapter III and in accordance with the research objectives and questions in Chapter I, it can be concluded about the results of improvement with the existence of Channel Dump as follows:

**Company**




- Provides mining cost savings by reducing hauling distances and the allocation of fuel used (25 m composite 35 Fleet)
- Helps increase the blending ratio for disposal from 1 : 2.44 to 1 : 3.41

**Worker**




- Increasing worker productivity in carrying out soft material (Hauler) stockpiling activities
- Reducing the workload of dozer work at the disposal site does not require dozer support)
- Easier monitoring control of soft material stockpiling by using channel dump.

**Safety (K3)**



- Reducing the risk of stockpiling soft materials using manual/conventional methods & at long distances (trucks & dozers) which involve more workers and the risk of stockpiling materials directly on the water.
- Reducing risks related to geotechnical aspects in the disposal area.
- Reducing the risk of traffic density due to the supply of OB blasting materials from different levels

**GMP**



- Adequate blast material is available to form roads, dumping points, and front loading according to standards (geometry & carrying capacity, etc.)
- Reducing the use of fuel used compared to conventional methods. Utilization of loader & hauler tools has increased supported by reduced slippery delays and wait support as well as waiting material blending

Figure 10. Channel Dump Impact & Benefit

Based on the results of the financial analysis that has been carried out in Chapter III using the Discounted Cash Flow method, the result of the Net Present Value value of Rp. 2,429,003,770.83 with a value of  $> 0$  and the probability of  $NPV < 0 = 0\%$ , based on the NPV parameter, it can be said that this project is feasible. Next is the Payback Period parameter with a value of 1.17. With a very large impact and benefits, it can be said that Payback Period 1.17 is very feasible. Then the next parameter, namely the Profitability Index with a value of 1.37 based on the results of the analysis, can be said to be feasible because the PI value  $> 1$ . The last parameter reviewed is the Internal Rate of Return with the results of the analysis showing a value of 38.15%, in this project fully the project costs will be borne using the company's equity, so that the IRR value that is more than WACC is a feasible value or figure.

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Finally, hopefully this Final Project can provide many benefits for its readers and make a maximum contribution to the world of education, companies and mining in Indonesia.

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