
ENVIRONMENTAL QUALITY COST ANALYSIS AT PT. ANUGRAH HARISMA BARAKAH



Zalza Berlinda Pratiwi¹
Universitas Negeri Surabaya, Surabaya, Indonesia
zalza.19104@mhs.unesa.ac.id

Dian Anita Nuswantara²
Universitas Negeri Surabaya, Surabaya, Indonesia
diananita@unesa.ac.id

Abstract

This study evaluates the environmental responsibility of the mining company PT. AHB in reducing the negative impacts of mining activities. The results show that PT. AHB has implemented programs to improve the environment in accordance with applicable government regulations. The company's environmental programs include: prevention costs (acid mine drainage mitigation, dam/pond construction, sampling), detection costs (laboratory analysis, procurement of monitoring equipment, water, air, and soil quality management, and environmental consultation), and internal failure costs (hazardous waste management, biodiversity, land management, nurseries, planting, and maintenance of flora/fauna). The company's environmental costs are also influenced by dynamic environmental conditions and often exceed the planned budget. As part of its business strategy, PT. AHB also integrates environmental costs into production costs. This study emphasizes the importance of the company's commitment to sustainable environmental management.

Keywords: Environmental Quality Cost Analysis, PT. Anugrah Harisma Barakah

INTRODUCTION

The environmental crisis stems from increasing human needs. The greater the demand, the more companies are operating. One example is the growing demand for nickel for electric vehicle batteries. Global demand for nickel in 2022 increased by 367% compared to the previous year.(Ahdiat, 2023).

As demand for minerals grows, more land is being used for mining. This increased land clearing has resulted in extensive deforestation of tropical forests.(Priyambodo, 2022).

Excessive mining activities will have a negative impact on the environment, not only animals but also the communities around the mine. One example is a village near the mine, Baraputri, (2023) explains Boenaga Village, Lasolo Islands District in North Konawe Regency, Southeast Sulawesi where the sea has been polluted with mining waste. On Thursday, July 7, 2022, the village experienced a mud flood, the cause of which is suspected to be from one of the nickel mining companies in the area. The mud flood in Boenaga Village was caused by the company's sedimentation tank breaking, due to being unable to accommodate the water discharge.

Therefore, in order to maintain environmental sustainability, Indonesia has implemented several policies in Article 74 of the Law, which states that Limited Liability Companies that carry out their business activities in the field of and/or related to natural resources are required to carry out social and environmental responsibilities (paragraph 1). These responsibilities are the company's obligations that are budgeted and calculated as company costs, the implementation of which is carried out by paying attention to propriety and fairness (paragraph 2). For companies that do not carry them out, they will be subject to sanctions in accordance with applicable laws (paragraph 3). Meanwhile, Article 66 states that all companies are required to present information on social and environmental responsibility (TJSL) performance in the Annual Report of the Board of Directors to the GMS.

By managing the environment around the company, it demonstrates its responsibility. Environmental management activities will incur environmental costs.

Environmental costs are called environmental quality costs. Environmental quality costs are grouped into four categories: prevention costs, detection costs, internal failure costs, and external failure costs.(Hansen & Mowen, 2011)

In the research(Annisa Rizkaninghadi Imansari et al., 2019)Regarding Green Accounting and the Hospitality Industry: A Necessity, the study concludes that the hotels studied care about their environment and incur environmental costs. The environmental costs incurred by the three hotels vary due to the differences in activities undertaken by each hotel.

Research (Franciska et al., 2019)with the title Analysis of Environmental Cost Accounting Implementation at PT. Royal Coconut Airmadidi from the results of the study the company has not made a Financial Report specifically regarding the Environmental Cost Report. The researcher attempted to make an Environmental Report based on the data provided by the Company. The identified Environmental Costs related to waste processing at PT. Royal Coconut Airmadidi are: WWTP Labor Costs, Wastewater Quality Testing Costs, Electricity Costs for water pump use, Chlorine Purchase Costs, Air Quality Testing Costs, Investment Costs, and Land Restoration Costs.

This study examines PT Anugrah Harisma Barakah, a private nickel mining company in Southeast Sulawesi. The study discusses PT Anugrah Harisma Barakah's environmental

accountability and attempts to analyze the company's activities and their impact on environmental costs.

This research uses a qualitative research method where the researcher will conduct observations at the company, environmental observations, interviews and look at the documentation in the existing environmental cost reports and then identify them according to the environmental quality cost components.

LITERATURE REVIEW

Legitimacy of theory

Legitimacy theory was first proposed by Dowling & Pfeffer (1975), who stated that legitimacy can be defined as a potential benefit or resource for a company to survive and grow. Legitimacy theory is rooted in the idea of a social contract between corporations and society.

Green Accounting

The concept of green (environmental accounting) has actually been developing since the 1970s in Europe. Pressure from non-governmental organizations and increasing environmental awareness among the public have urged companies to implement environmental management rather than simply engage in industrial activities for the sake of business. The goal is to improve the efficiency of environmental management by assessing environmental activities from the perspective of costs (environmental costs) and benefits (economic benefits), as well as producing environmental protection effects (Almilia and Wijayanto, 2007).

Environmental Quality Costs

(Hansen & Mowen, 2011), Environmental costs can be called environmental quality costs. Same as quality costs, they occur due to poor environmental quality or poor environmental quality may occur.

Environment

In the KBBI (Big Indonesian Dictionary), the word environment means area (region, etc.) (Darsono, 1995). Environment is all objects and conditions that contain humans and their activities. All of these things are in a space where humans live.

RESEARCH METHOD

Types of Research

This study uses qualitative research because the research requires information obtained directly from the sources. According to Creswell (2009), qualitative research is the process of exploring and understanding the meaning of individual and group behavior, describing social or humanitarian issues. The research process includes developing preliminary research questions and procedures, collecting data in a participant setting, analyzing the data inductively, constructing partial data into themes, and then interpreting the meaning of the data. The final activity is creating a report with a flexible structure.

Research Site

The research location chosen by the author is a nickel mining company in Southeast Sulawesi, namely PT. Anugrah Harisma Barakah, a private, non-public company.

Data collection technique

In this study, the data collection techniques used are documentation and observation. These data collection techniques are expected to complement the data needed by researchers to obtain in-depth data.

According to Nasution, in his book (Sugiyono, 2017:106), stated that observation is the foundation of all science. Scientists can only work based on data, namely facts about the real world obtained through observation. This data is collected, often with the aid of various sophisticated tools, so that objects, both very small and very distant, can be clearly observed. In this study, unstructured observations will be conducted. Unstructured observations according to (Sugiyono, 2017) An observation that is not systematically prepared regarding what will be observed. In this research, the researcher still doesn't know exactly what will be observed. Therefore, the researcher will conduct free observations, then record anything interesting, analyze it, and draw conclusions.

Next is the data collection technique with documents, according to (Sugiyono, 2017) Documents can be written texts, drawings, or monumental works by individuals. In this research, the documents will be company financial reports, which will serve as data sources to support the data from observations and interviews.

RESULTS AND DISCUSSION

Activities that Impact the Environment and Company Programs to Minimize Environmental Impact

As a company operating in the mining business sector, there will definitely be an impact on the environment. The company has a responsibility to ensure that the environment is maintained.

1. Activities and their impact on the environment

PT.AHB's activities that have an impact on the environment are as follows:

a. Drilling

Drilling activity is an activity to drill the soil at the mining location; this activity aims to find out the type and sequence of soil at the mining location.

Soil drilling can cause changes in soil structure, which are addressed through fertilizer application and regular inspections. Furthermore, the company allocates funds for land reclamation as part of its internal impact management efforts. Despite these efforts, soil damage persists and will take a long time to fully recover.

The use of heavy equipment in drilling produces pollutants and dust that affect air quality. The company has implemented preventative measures to reduce air pollution, although it cannot be completely eliminated. Furthermore, heavy equipment also generates hazardous and toxic waste, which is managed and transported in accordance with regulations to prevent excessive environmental damage. These waste management efforts ensure that environmental impacts are minimized.

b. Land Clearing

Land clearing is an activity carried out by PT. AHB to clear land from trees and bushes around the mining location using heavy equipment.

Deforestation of trees and bushes causes habitat destruction for flora and fauna, requiring companies to provide new habitats for those losing their habitats and to monitor populations to ensure they remain within safe limits. Despite preventative

measures and monitoring, habitat destruction still poses risks and requires time to fully recover.

Furthermore, the land clearing process using heavy equipment produces pollutants and dust that affect air quality around the mining area. The company has implemented various efforts to prevent air pollution, although it cannot be completely eliminated. The use of heavy equipment also generates hazardous and toxic waste, which is managed in accordance with regulations through safe storage and transportation. While waste is still generated, proper management ensures that negative impacts on the environment are minimized.

c. Topsoil and Overburden Removal.

To get minerals from the ground, companies have to dig up the soil above the mineral soil. Digging up the soil will damage the soil layer and the roots that hold the soil together.

The removed topsoil and overburden are stored for reuse during mine closure. To prevent further soil degradation, the company applies fertilizer and conducts regular soil quality checks, and allocates internal failure costs for land remediation. Despite this, the risk of soil degradation remains and recovery takes time. Soil degradation also increases the risk of erosion due to the loss of topsoil, which provides shelter for tree roots.

To prevent further erosion, the company constructed dams to regulate water flow, regraded the land, and replanted trees. These efforts successfully reduced the risk of major erosion, although they did not completely eliminate the potential for external failures. Furthermore, the removal of topsoil using heavy equipment generates pollutants and dust that affect ambient air quality. The company has implemented various air pollution prevention measures to minimize the impact, although pollution cannot be completely eliminated.

d. Mineral extraction and mineral transportation

In the activity of extracting minerals using heavy equipment, and transporting them using trucks, they are stored in piles that are adjusted to the existing mineral content. The extraction and transportation of minerals using heavy equipment and trucks generates dust and pollutants that can affect air quality around mining areas and endanger workers' health. To mitigate these impacts, the company conducts regular air quality checks and sprays roads with water to suppress dust. However, the dust and pollutants generated by these activities cannot be completely eliminated.

In addition, heavy equipment and trucks also produce hazardous and toxic waste, which is managed as part of internal waste management, with storage and transportation carried out in accordance with applicable regulations. While waste is still generated due to machine use, proper waste management ensures its impact on the environment is minimized.

e. Mineral Mixing

Mineral mixing can have environmental impacts due to the use of heavy equipment. This creates dust and waste.

The use of heavy equipment in mining activities generates hazardous waste, which is stored and managed before being finally disposed of at a facility with a hazardous waste management permit. Although companies do not take preventative measures against

hazardous waste, they manage it as best as possible to reduce the risk of environmental pollution.

Furthermore, mineral mixing activities, which also involve the use of heavy equipment, contribute to air pollution. To address this, the company routinely checks air quality and sprays roads with water to reduce dust. However, despite these preventative measures and checks, the dust generated by these activities cannot be completely eliminated.

f. **Sampling Stacking**

Sampling stacking is an activity where soil with mineral content is stacked according to the content, this stacking is done to facilitate mixing of mineral content.

The activity of piling excavated soil samples causes the soil to become clumped, dry, and produce dust that can affect air quality. To address this, the company conducts air quality checks and sprays roads with water to reduce dust, although it cannot completely eliminate it. Piling soil also causes water pollution due to rainwater mixing with soil solutions.

To prevent this, the company built a check dam to pre-sediment the water, tested its acidity levels, and ensured that the water quality met government standards before being discharged into the environment. Furthermore, the use of heavy equipment for mineral mixing also generates hazardous and toxic waste, which is managed as part of internal management, with storage and transportation in accordance with regulations. While waste is still generated, proper management ensures its environmental impact is minimized.

g. **Mineral Transportation**

Transporting minerals from the sample pile to the port requires transportation equipment such as trucks to transport the minerals.

Transporting samples by truck can cause air pollution, so the company conducts air quality checks and preventive measures by spraying roads with water to reduce dust. Despite these precautions and checks, the dust generated from these activities cannot be completely eliminated. Furthermore, the use of heavy equipment also generates oil waste and hazardous waste, which are managed as part of internal failure. This waste is stored in accordance with applicable regulations and will be transported to a designated location. Although waste is still generated from the use of machine tools, proper management ensures that its impact on the environment is minimized.

2. Company programs in dealing with operational impacts

As an environmental responsibility, PT. AHB has several activities in maintaining the environment, both in the form of prevention and failure costs due to the activities carried out, the following are these activities:

a. Prevention Costs

Prevention costs are costs incurred by company activities to prevent environmental quality from getting worse. The following are the prevention costs incurred by PT. AHB:

1) **Prevention and control of acid mine drainage**

The acid water produced by PT. AHB is water that must be prevented from coming to the surface. With this prevention process, it is hoped that the acid water that occurs as a result of mining activities will not pollute marine biota.

2) Making a check dam

A check dam is a small dam that slows down water flow during the rainy season. Dredging of shallow check dams is carried out during the dry season.

Check dams are built when other check dams fill up during heavy rainfall. When heavy rainfall occurs and the water from the check dam overflows, the company will build a new check dam to accommodate the flowing water.

b. Detection Cost

Detection costs are the costs incurred to detect environmental standards. Detection allows companies to make decisions more quickly to prevent worsening environmental conditions. Detection costs include the following:

a) Sampling example

Sampling is an activity where samples are taken by an independent body so that there will be no fraud in reporting environmental conditions.

b) Laboratory Analysis

Laboratory analysis is a significant cost in assessing environmental quality. Laboratory costs vary depending on the activity being tested.

c) Environmental Consultant

PT. AHB, whose production activities are closely linked to the environment, requires an environmental consultant. An environmental consultant is someone who works outside the company to assist in sustainable environmental monitoring.

d) Monitoring Equipment Costs

To find out whether the environmental quality is good, of course monitoring activities are needed. Environmental monitoring activities require adequate monitoring equipment to find out whether the environment is polluted or not.

e) Environmental Monitoring

Environmental monitoring at PT. AHB is an activity that is always carried out by the company. Environmental monitoring activities are carried out to find out whether the surrounding environment is polluted by mining activities or not.

f) Water, Air, and Soil Quality Management

Water, Air and Land are the environment that must be maintained by PT. AHB because with good environmental quality it can create a comfortable place for both workers and animals in the area.

g) Monitoring of flora and fauna

At PT. AHB, they monitor flora and fauna around the mining area. They not only monitor terrestrial flora and fauna, but also marine life.

c. Internal Failure Costs

Internal failure costs arise from the costs incurred to manage unavoidable negative impacts or the results of operational activities that do produce such impacts. Internal failure costs are activities to manage the results of these impacts so that they do not harm the environment outside the company. The following are examples of internal failure costs:

a) Waste Management

PT.AHB manages waste in accordance with regulations issued by the government.

b) Land Management

The former mining land was re-covered, the land was arranged and covered with soil, then re-greened.

c) Fertilizer procurement

The use of fertilizer is a step to improve soil conditions and increase plant growth.

d) Plant seedling nursery

Plants to be planted on reclamation sites must go through the nursery's stages and meet the required requirements before being transported. Plant growth depends on the individual plant species, and takes approximately 4-6 months.

e) Replanting Trees

After the nursery, PT. AHB will carry out seed planting during the rainy season, during the rainy season the groundwater and weather conditions support the initial growth of the planting.

f) Biodiversity

Biodiversity is the activity of selecting plants that have value for the surrounding environment. The plants selected have economic benefits for the surrounding community, ensuring that the island's native plants are not limited to native plants but also include plants from outside the island.

d. External Failure Costs

External failure costs are costs incurred by the company to protect the external environment from the impacts of mining operations.

a) Providing assistance to surrounding villages

The company provides assistance to villages in community empowerment. This assistance includes Village-Owned Enterprise (BUMDes) training.

Environmental Cost Report for 2021-2022

PT AHB's environmental reporting costs will be included in its Work Plan and Budget (RKAB) to obtain government permits. Once approved, the company can begin mining activities. According to sources, the planned costs are calculated from previous years.

Environmental costs are also significantly affected by the weather and environmental conditions of the year. Costs typically increase due to heavy rainfall, which requires companies to build dams or ponds to prevent water from polluting the surrounding ocean.

The environmental report owned by PT. AHB uses a cash approach, because the existing costs are directly purchased and included in the report, the following is the environmental cost report for 2021 and 2022:

PT. Anugrah Harisma Bankah						
Laporan Biaya Lingkungan						
Tahun 2021 dan 2022						
	Rencana		Realisasi		% Dari total biaya realisasi	
	2021	2022	2021	2022	2021	2022
Biaya Pencegahan						
Pencegahan dan penanganan gas asam tambang	Rp 15.000.000,00	Rp 18.730.000,00	Rp -	Rp 625.000,00		
Penggerakan sipal seperti pembuatan dam/kolam	Rp 100.000.000,00	Rp 100.000.000,00	Rp 228.045.000,00	Rp 247.427.000,00		
Total	Rp 115.000.000,00	Rp 118.730.000,00	Rp 228.045.000,00	Rp 248.052.000,00	51,69%	18,65%
Biaya deteksi						
Pengambilan Sample Cerdah	Rp 10.000.000,00	Rp 12.500.000,00	Rp 5.000.000,00	Rp 6.000.000,00		
Analisis Laboratorium	Rp 30.000.000,00	Rp 32.500.000,00	Rp 15.000.000,00	Rp 7.300.000,00		
Pengadaan peralatan panta	Rp 22.500.000,00	Rp 20.000.000,00	Rp 14.350.000,00	Rp 331.375.000,00		
Pengelolaan kualitas air	Rp 120.000.000,00	Rp 87.549.997,00	Rp -	Rp 48.833.333,00		
Pengelolaan kualitas Udara	Rp 15.000.000,00	Rp 5.475.000,00	Rp 37.000.000,00	Rp 15.150.000,00		
Pengelolaan kualitas Tanah	Rp 15.000.000,00	Rp 4.875.000,00	Rp -	Rp 11.400.000,00		
Pelaksanaan pemantauan	Rp 50.000.000,00	Rp 65.000.000,00	Rp 25.000.000,00	Rp 30.000.000,00		
Biaya Lainnya (um tak Flov dan fuma)	Rp 20.000.000,00	Rp 18.000.000,00	Rp 10.000.000,00	Rp 1.500.000,00		
Kontrol dan Lingkungan	Rp 30.000.000,00	Rp -	Rp 15.000.000,00	Rp -		
Total	Rp 250.000.000,00	Rp 180.899.997,00	Rp 141.350.000,00	Rp 451.598.333,00	32,04%	33,94%
Biaya Kegagalan Internal						
Pengelolaan Limbah B3	Rp 30.000.000,00	Rp 30.000.000,00	Rp 5.000.000,00	Rp 1.200.000,00		
Samudkaragaman hayati	Rp 10.000.000,00	Rp 3.375.000,00	Rp -	Rp 4.500.000,00		
Pemantauan Lahar	Rp 430.000.000,00	Rp 380.000.000,00	Rp 20.000.000,00	Rp 465.970.000,00		
Pemantauan	Rp 200.000.000,00	Rp 7.500.000,00	Rp 12.500.000,00	Rp 9.408.000,00		
Pemantauan	Rp 175.000.000,00	Rp 45.000.000,00	Rp 17.700.000,00	Rp 60.289.000,00		
Pemeliharaan	Rp 140.000.000,00	Rp 50.000.000,00	Rp 10.609.200,00	Rp 83.375.800,00		
Pembibitan CoverCrop	Rp -	Rp -	Rp -	Rp -		
Total	Rp 985.000.000,00	Rp 515.875.000,00	Rp 65.809.200,00	Rp 624.742.800,00	14,92%	46,96%
Biaya Kegagalan Eksternal						
Biaya Bantuan Untuk Desa	Rp 6.000.000,00	Rp 6.000.000,00	Rp 6.000.000,00	Rp 6.000.000,00	1,36%	0,45%
Total Biaya Kualitas Lingkungan	Rp 1.356.000.000,00	Rp 821.524.997,00	Rp 441.204.200,00	Rp 1.330.358.133,00	100,00%	100,00%

Figure 1.

2021 and 2022 Environmental Cost Reports prepared by researchers

Prevention costs in 2021 were 51.69%, detection costs 32.4%, internal failure costs 14.92%, and external failure costs 1.36%. This year, prevention and detection costs outweighed failure costs.

In 2021, several preventative costs were not recorded in the environmental report due to the physical distancing policy related to the COVID-19 pandemic, which prevented mining activities from being carried out. This policy prevented some employees tasked with collecting samples from the mine. Consequently, these activities were not recorded in 2021.

In 2022, the prevention costs incurred were 18.65%, detection costs were 33.94%, external failure costs incurred were 46.96%, and external failure costs were 0.45%.

According to the environmental cost report owned by PT. AHB, the development of PT. AHB's environmental cost control in 2021 and 2022 is as follows:

$$\frac{\text{Final Cost} - \text{Initial Cost}}{\text{Initial Costs}} \times 100\%$$

The total nominal cost of prevention is the cost of deflection combined with the cost of detection, while the cost of failure includes the cost of external failure and the cost of internal failure.

1. 2022 Prevention Cost Increase
$$\frac{Rp669.610.333,00 - Rp369.395.000,00}{Rp369.395.000,00} \times 100\% = 89\%$$
2. 2022 Failure Cost Increase
$$\frac{Rp630.742.800,00 - Rp71.809.200,00}{Rp71.809.200,00} \times 100\% = 778\%$$

This surge was due to differences in post-mining land use in 2021 and 2022, which increased internal failure costs. However, in 2022, prevention costs remained greater than failure costs.

According to sources, this was due to the fact that they had mineral stocks at the mine site in 2019, when mining commenced. From 2019 to 2021, the company focused on selling the remaining stock.

CONCLUSION

The conclusion of this study is that the mining company PT. AHB has several programs in place to mitigate the negative impacts of mining activities. PT. AHB is responsible for improving the environment in accordance with existing government regulations. PT. AHB has the following programs:

Prevention Costs namely prevention and control of acid mine drainage, civil works such as dam/pond construction, sampling

Detection Cost namely, Laboratory Analysis, Procurement of monitoring equipment, Water quality management, Air quality management, Soil quality management, Monitoring implementation, Environmental Consultant

Internal Failure Costs namely, B3 Waste Management, Biodiversity, Land Management, Nursery, Planting, Maintenance, CoverCrop Purchase, Other Costs (for Flora and Fauna)

External Failure Costs namely, costs for assistance to villages in the mining area

Environmental costs are greatly influenced by the condition of the surrounding environment, because humans cannot predict the environment so that some costs are more than the planned costs.

REFERENCES

- Ahdiat, A. (2023, July 6). Ekspor Nikel Indonesia Meroket pada Tahun 2022, Rekor Tertinggi Sedekade. Databooks.
- Almilia, L. S., & Wijayanto, D. (2007). Pengaruh Environmental Performance dan Environmental Disclosure Terhadap Economic Performance. The 1st Accounting Conference.
- Annisa Rizkaninghadi Imansari, Roekhudin, & Yeney Widya Prihatiningtias. (2019). Akuntansi Hijau dan Industri Perhotelan: Sebuah Keniscayaan. Jurnal Economia, 15(2), 189–208.
- Baraputri, V. (2023, July). Lingkungan di Sulawesi Tenggara terancam limbah tambang nikel- 'Yang Kamu Rusak adalah Masa Depan'. BBC News Indonesia.

- Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage London.
- Darsono, V. (1995). *Pengantar Ilmu Lingkungan*.
- Dowling, J., & Pfeffer, J. (1975). Organizational legitimacy: Social values and organizational behavior. *Pacific Sociological Review*, 18(1), 122–136.
- Franciska, R. M., Sondakh, J. J., & Tirayoh, V. Z. (2019). Analisis penerapan akuntansi biaya lingkungan pada pt. royal coconut airmadidi. *Going Concern: Jurnal Riset Akuntansi*, 14(1), 58–63.
- Hansen, & Mowen. (2011). *Akuntnasi Manajerial* (edisi 8).
- Priyambodo, U. (2022). 58,2% Penggundulan Hutan Tropis oleh Pertambangan Terjadi di Indonesia. *National Geographic Indonesia*.
- Sugiyono. (2017). *Metode Penelitian Kualitatif* (3rd ed.).
- Undang-Undang (UU) Nomor 40 Tahun 2007 Tentang Perseroan Terbatas, Pub. L. No. 40 (2007).