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Identification of Hazardous and Toxic Waste Characterization in the Mining Activities of PT Semen Padang

*Armando Yosephin Butar Butar, Ahmad Ikhsan, Abdul Razak, Linda Handayuni, Elsa Yuniarti

Master Program of Environmental Science, Postgraduate School-Universitas Negeri Padang
*E–mail: armandobutarbutar@gmail

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ABSTRACT

Mining business activities in addition to producing mineral and coal production, also produce solid and liquid hazardous and toxic waste materials that have the potential to pollute the environment and can reduce the quality of human health and other living things mining. PT Semen Padang as the holder of a Production Operation Mining Business Permit (IUP OP), in addition to producing mining commodities in the form of limestone, silica, and clay, also has the potential to produce hazardous and toxic waste materials from mining activities, especially from the results of activities in mining workshops, both solid waste and liquid waste. For this reason, it is necessary to properly manage hazardous and toxic waste materials. PT Semen Padang has now carried out hazardous and toxic waste disposal by temporarily storing the hazardous and toxic waste it produces which is stored in a temporary storage area for hazardous and toxic waste materials.

KeyWords: PT Semen Padang, Hazardous, Mining, Waste, IUP OP.

INTRODUCTION

Mineral and coal mining business activities have an important role in providing real added value for national economic growth and sustainable regional development the implementation of which is still constrained by the authority between the Central Government and Regional Governments, licensing, protection of affected communities, mining data and information, supervision, and sanctions. So that the implementation of mineral and coal mining is not running effectively and has not been able to provide optimal added value.

Mining Business Activities (IUP) are part or all of the stages of activities in the framework of managing and exploiting minerals or coal which includes general investigations, exploration, feasibility studies, construction, mining, processing/refining/development or utilization, transportation, and sales, as well as activities post-mining (Hartana, 2021). Where this activity has special characteristics, namely capital-intensive, risk-intensive, and technology-intensive. Therefore, the implementation of mining business activities must have careful and systematic planning in terms of technical, economic, and environmental aspects so that mining can be carried out by good and environmentally sound mining techniques.

IUP in addition to producing mineral and coal production, also produces solid and liquid hazardous and toxic waste (Saepudin *et al*., 2022) which has the potential to pollute the environment and can reduce the quality of human health and other living things in IUP. Based on the hazards posed, the nature of hazardous and toxic waste is grouped into toxic materials, oxidizing materials, corrosive materials, water-reactive materials, flammable materials, explosive materials, compressed gases, acid-reactive materials, and heavy metals

(Malayadi, 2017; Dewata & Putra, 2021). The consequences of this toxic substance can be in the form of disorders of the nerves, disorders of the liver and kidneys, shortness of breath, lung disorders, and leukemia.

The danger caused by oxidizing agents can cause fires because these substances themselves can produce oxygen, corrosive materials can pose a danger if in contact with the skin, and damage to breathing apparatus. Wogalter *et al* (2021) add it is different from materials that are reactive to water which will give off heat and be flammable, besides that flammable materials will certainly cause great damage (fire), compressed gas has a danger that is toxic, asphyxiant, corrosive and easily flammable. Lewis (2008) further described materials that are reactive to acids generate heat and are flammable or toxic gases and are corrosive and explosive. Radioactive materials have hazards related to their radiation beam, when this radiation enters the body it can cause somatic and genetic effects. The somatic effect in question is acute and can also be chronic, and the last one is heavy metals, the effect of heavy metals on health is inhibiting the formation of hemoglobin, nervous disorders, kidney stones, and anemia. The impact caused by hazardous and toxic waste that is directly disposed of into the environment without carrying out a management process is enormous and can be cumulative. So that the impact is a chain following the process of transportation (circulation) of materials and the nets of the food chain.

PT Semen Padang as the holder of an IUP OP apart from producing mining commodities in the form of limestone, silica, and clay also has the potential to produce B3 waste from mining activities, especially from the results of activities in mining workshops, both solid waste and liquid waste. For this reason, it is necessary to properly manage hazardous and toxic waste waste. PT Semen Padang is currently storing hazardous and toxic waste temporarily storing the hazardous and toxic waste it produces which is stored in the hazardous and toxic waste temporary storage area.

METHOD

The research method used by the author uses direct observation methods to PT Semen Padang, this study aims to provide information regarding sanitation and understanding of the management of hazardous and toxic waste in terms of identifying and knowing the characterization of hazardous and toxic waste at PT Semen Padang.

RESULTS

3.1 Definition of Hazardous and Toxic Waste

By Government Regulation No. 22/2021 concerning "the implementation of environmental protection and management" (Suhartawan *et al*., 2022), there are several definitions as follows: 1) Hazardous and toxic materials are hazardous and toxic materials, hereinafter abbreviated as hazardous and toxic waste, are substances, energy and/or other components which due to their nature, concentration and/or amount, either directly or indirectly, can pollute and/or damage the environment, and/or endanger the environment, health. As well as the survival of humans and other living things; 2) Hazardous and toxic waste, hereinafter referred to as hazardous and toxic waste, is the residue of a business and/or activity containing hazardous and toxic waste; 3) Hazardous and toxic waste

management is an activity that includes reduction, storage, collection, transportation, utilization, processing. and/or hoarding. Everyone who generates Hazardous and toxic waste is required to manage the Hazardous and toxic waste they produce; and 4) Hazardous and toxic waste disposal is an activity for storing hazardous and toxic waste carried out by a Hazardous and toxic waste producer to temporarily store the hazardous and toxic waste it produces.

3.2 Identification and Characterization of Hazardous and Toxic Waste

This hazardous waste is specifically identified and defined based on the applicable regulations. All hazardous and toxic waste must be stored, collected, transported, processed, and managed according to regulations. All waste must be identified and classified before disposal, and whenever possible, this identification must be carried out before the hazardous waste is formed (Lake & Disch, 1992). In general, waste that is on a certain list or that has hazardous characteristics based on the test results is determined as Hazardous and toxic waste. Based on Government Regulation No. 22/2021, the characteristics of hazardous and toxic waste include explosive, flammable, reactive, infectious, corrosive, and toxic (Wirodimurti *et al*., 2022). If there is waste outside the list of Hazardous and toxic waste as listed in Appendix IX which is an integral part of this Government Regulation which is indicated to have the characteristics of Hazardous and toxic waste, the Minister is required to carry out a characteristic test to identify the waste as category 1 Hazardous and toxic waste, category 2 Hazardous and toxic waste, or non-Hazardous and toxic waste.

By Government Regulation No. 22/2021 Appendix IX, it is stated that a person who generates Hazardous and toxic waste is required to manage the Hazardous and toxic waste they produce. Hazardous and toxic waste based on its hazard category consists of: 1) Category 1 hazardous waste; and 2) Category 2 hazardous waste. Hazardous and toxic waste based on source consists of 1) Hazardous and toxic waste from unspecified sources; and 2) Hazardous and toxic waste from expired hazardous and toxic waste spilled hazardous and toxic waste that does not meet product specifications to be disposed of, and used hazardous and toxic waste packaging. Whereas hazardous waste from specific sources includes: 1) Hazardous and toxic waste from general specific sources; and 2) Hazardous and toxic waste from specific sources.

3.3 Results of Identification and Characterization of Hazardous and Toxic Waste

Identification and characteristics of hazardous and toxic waste from workshops on mining activities in PT Semen Padang's Production Operation IUP are routinely carried out by observing the progress of mining activities and production.

Results of hazardous waste identification and characterization

Identification results and characteristics of hazardous and toxic waste can be seen in the Table 1 below.

Table 1. Characteristics (List) of hazardous and toxic waste

No	Waste sources	Process of waste generation activities	Characteristics						Category	
			Explosive (E)	Flammable (I)	Reactive (R)	Infective (X)	Corrosive (C)	Toxic (T)	I	II
1	Used battery	Maintanance unit, genset and crusher and conveyor belt								
2	Used oil	Maintanance unit, genset and crusher and conveyor belt								

No	Waste sources	Process of waste generation activities	Characteristics						Category	
			Explosive (E)	Flammable (I)	Reactive (R)	Infective (X)	Corrosive (C)	Toxic (T)	I	II
3	Used filters	Maintanance unit, genset and crusher and conveyor belt								
4	Used hose	Maintanance unit, genset and crusher and conveyor belt								
5	Used tl lamp	Lighting in work area								
6	Hazardous and toxic waste contaminated packaging (used paint cans and used drums)	Maintanance unit, genset and crusher and conveyor belt								
7	Hazardous and toxic waste contaminated majun and gloves	Maintanance unit, genset and crusher and conveyor belt								

Hazardous and toxic waste products from the limestone, clay and silica mining activity workshop from PT Semen Padang were produced in two, namely: a. Solid waste Classified based on the type of waste, namely:

Figure 1. Used battery


Figure 2. Used filter


Figure 3. Used hose

Figure 4. Used tower lamps

Figure 5. Hazardous and toxic waste contaminated packaging

Figure 6. Hazardous and toxic waste contaminated cloth and gloves

Figure 7.Used Oil stored in the Drum

Figure 8. Hazardous and toxic waste TPS

CONCLUSION

Based on the results above, it can be concluded that the management of hazardous and toxic waste related to the results of workshop activities at PT Semen Padang's mining activities has been going quite well with several deficiencies that can be corrected in the future. Its management includes identification and characterization of hazardous and toxic waste consisting of used batteries, used filters, used hoses, hazardous and toxic waste contaminated rags and gloves, and so on.

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