



Effectiveness of Environmental Law Enforcement against Industrial Waste Pollution: Problems of Supervision, Compliance, and Sanction Implementation

Imam Taufik Harahap¹, Dian Eriani², Syah Iskandar³, Mailina Harahap⁴, Ismatur Rahmi⁵

^{1, 2, 3}Lecturer at the National Islamic University of Indonesia, Bireuen-Aceh.

⁴Lecturer at Muhammadiyah University of North Sumatra.

⁵Student of the National Islamic University of Indonesia, Bireuen-Aceh.
imamtaufik827@gmail.com

Abstract: Industrial waste pollution remains a significant environmental problem requiring effective law enforcement to ensure sustainable environmental protection and management. This study aims to analyze the effectiveness of environmental law enforcement on industrial waste pollution, emphasizing the aspects of supervision, compliance of industrial actors, and the application of sanctions. The study uses a normative legal research method with a statute approach, a conceptual approach, and a case approach. Primary legal materials include Law Number 32 of 2009, Law Number 6 of 2023, Government Regulation Number 22 of 2021, and relevant court decisions, supported by secondary legal materials in the form of books, scientific journals, and official documents. The results of the study indicate that the effectiveness of law enforcement is not optimal despite an adequate regulatory framework. The main obstacles lie in inconsistent supervision, varying levels of compliance among industrial actors, and the application of sanctions that have not fully provided a deterrent effect. Therefore, strengthening supervisory capacity, enhancing a culture of compliance, and consistent enforcement of sanctions are important prerequisites for realizing an effective, equitable, and sustainable environmental law enforcement system.

Keywords: Environmental Law Enforcement; Industrial Waste Pollution; Supervision; Compliance; Sanctions.

I. Introduction

Industrial sector development plays a strategic role in driving national economic growth through increased investment, productivity, and employment. Despite these contributions, industrial activity is also a major source of environmental pollution if production waste is not managed in accordance with statutory provisions. The disposal of liquid waste, solid waste, air emissions, and hazardous and toxic waste (B3) can degrade water, soil, and air quality, harm public health, and threaten ecosystem sustainability (Birnie et al., 2009; Sands et al., 2018). Therefore, industrial waste pollution is no longer viewed as merely a technical issue but has become a legal issue that demands effective monitoring systems, business compliance, and environmental law enforcement.

Environmental protection is an essential part of the concept of sustainable development, which requires a balance between economic growth, social justice, and environmental sustainability (WCED, 1987). In practice, the success of environmental protection is determined not only by the existence of regulations but also by the state's ability to effectively implement the law (environmental rule of law). The United Nations Environment Programme (UNEP, 2019) confirms that while many countries have adequate environmental regulations, their implementation still faces various obstacles, including weak

oversight, low business compliance, limited institutional capacity, and suboptimal sanctions. Similarly, the OECD (2009) states that the effectiveness of environmental law enforcement is determined by the integration of compliance promotion, oversight, and enforcement against violations.

In Indonesia, environmental protection has a constitutional basis through Article 28H paragraph (1) and Article 33 paragraph (4) of the 1945 Constitution of the Republic of Indonesia. These provisions were then implemented through Law Number 32 of 2009 concerning Environmental Protection and Management as amended by Law Number 6 of 2023, and Government Regulation Number 22 of 2021. These regulations provide law enforcement instruments in the form of supervision, administrative sanctions, civil liability, and criminal sanctions as an effort to prevent and overcome environmental pollution. However, various cases of industrial waste pollution that still occur show that the existence of regulations is not fully able to guarantee compliance by business actors or the effectiveness of law enforcement.

Several studies have shown that effective oversight and consistent sanctions impact the level of compliance of industry players. García et al. (2007) found that the environmental performance disclosure mechanism through the Corporate Performance Rating Program (PROPER) can improve corporate compliance through reputational pressure. Gupta et al. (2019) demonstrated that increased inspection intensity encourages companies to comply with environmental regulations, while Chakraborti (2022) demonstrated that law enforcement through inspections and sanctions has a deterrent effect on polluters. In the Indonesian context, Fansuri and Matheus (2022) emphasize the importance of criminal law enforcement for environmental pollution that impacts human rights, while Sarmilah et al. (2022) highlight the urgency of corporate civil liability as an instrument for environmental restoration. These findings demonstrate that the effectiveness of environmental law enforcement is influenced by the close relationship between oversight, compliance, and the application of sanctions.

However, previous research generally examines these three aspects separately. Some studies focus on the effectiveness of oversight, while others discuss corporate compliance or the effectiveness of administrative, civil, or criminal sanctions. However, these three aspects are integral to the environmental law enforcement system. Weak oversight reduces the detection rate of violations, low compliance reduces the effectiveness of regulations, and inconsistent application of sanctions diminishes the law's deterrent effect. Therefore, there is still a need to assess the effectiveness of environmental law enforcement through an approach that integrates these three dimensions.

Based on these conditions, this study offers a more comprehensive perspective by analyzing the effectiveness of environmental law enforcement regarding industrial waste pollution through three main dimensions: monitoring issues, industrial compliance, and the application of administrative, civil, and criminal sanctions. This approach is expected to provide a more comprehensive picture of the factors influencing the effectiveness of environmental law enforcement and generate relevant recommendations for strengthening the environmental protection and management system in Indonesia.

II. Research Methods

This research is a normative legal research that aims to analyze the effectiveness of environmental law enforcement against industrial waste pollution through a review of regulations, legal doctrine, and the development of law enforcement practices in Indonesia. The approaches used include a statute approach to examine laws and regulations related to environmental protection and management, a conceptual approach to analyze the concept of law enforcement effectiveness, compliance, and environmental responsibility, and a case approach by examining various court decisions and relevant industrial waste pollution cases. The legal materials consist of primary legal materials in the form of the 1945 Constitution of the Republic of Indonesia, Law Number 32 of 2009 concerning Environmental Protection and Management as amended by Law Number 6 of 2023, Government Regulation Number 22 of 2021, and court decisions related to environmental cases. Secondary legal materials are obtained from books, reputable national and international journal articles, and reports from relevant international institutions, while tertiary legal materials in the form of legal dictionaries and encyclopedias are used as supplements. All legal materials were collected through library research and analyzed qualitatively using descriptive-analytical methods by interpreting, connecting, and evaluating legal norms, doctrines, and law enforcement practices to obtain comprehensive legal arguments regarding the effectiveness of supervision, compliance of industrial actors, and the application of sanctions in dealing with industrial waste pollution.

III. Result and Discussion

3.1 Effectiveness of Environmental Monitoring on Industrial Waste Pollution

Supervision is a strategic instrument in the environmental law enforcement system because it serves as a preventive mechanism to prevent environmental pollution and damage before they cause broader impacts. Unlike the imposition of repressive sanctions after a violation occurs, supervision is aimed at ensuring that every business actor and/or activity carries out its environmental protection and management obligations in accordance with statutory provisions. Therefore, the effectiveness of supervision is a key indicator in assessing the success of environmental law enforcement, as the quality of supervision will determine the level of business actor compliance and influence the success of administrative, civil, and criminal sanctions.

In Indonesia's environmental legal system, oversight has a clear legal basis through Law Number 32 of 2009 concerning Environmental Protection and Management, as amended by Law Number 6 of 2023, and strengthened by Government Regulation Number 22 of 2021. This regulation authorizes the central and regional governments to conduct guidance, inspection, monitoring, compliance evaluation, and even take action against any business actors who fail to fulfill their environmental management obligations. Thus, oversight is not merely an administrative activity, but an integral part of the law enforcement system aimed at maintaining environmental quality in a sustainable manner.

Based on the analysis of statutory provisions, law enforcement theory, and various previous research findings, this study found that the effectiveness of environmental law enforcement regarding industrial waste pollution is influenced by three main dimensions: effective supervision, compliance by industry players, and consistent application of sanctions. These three dimensions form an interconnected system, so that weaknesses in one aspect will directly impact the overall success of law enforcement. Weak supervision will result in low

levels of compliance, while low compliance will increase the frequency of violations, ultimately requiring more intensive sanctions. Conversely, if supervision is carried out effectively, the potential for violations can be suppressed early, thereby achieving environmental protection goals through a preventative approach.

To provide a more systematic overview of the results of the analysis, the research findings are summarized in Table 1.

Table 1. Matrix of Results of Analysis of the Effectiveness of Environmental Law Enforcement against Industrial Waste Pollution.

Focus of Analysis	Legal basis	Research Findings	Implications
Supervision	Law No. 32 of 2009; Government Regulation No. 22 of 2021	Supervision has not been implemented optimally and consistently	Pollution prevention has not been effective
Industry Player Compliance	Law No. 32 of 2009; Government Regulation No. 22 of 2021	Business actors' compliance with waste management obligations is not yet evenly distributed.	The potential for environmental violations is still high
Implementation of Sanctions	Law No. 32 of 2009; Government Regulation No. 22 of 2021	The application of sanctions is not yet consistent and has not yet fully provided a deterrent effect.	The effectiveness of law enforcement is not optimal

As shown in Table 1, this study identified that the primary problem with environmental law enforcement is not the lack of regulation, but rather the suboptimal implementation of legal norms in oversight practices. Indonesia has relatively comprehensive legal instruments governing waste management obligations, environmental quality standards, oversight mechanisms, and the types of sanctions applicable to business actors. However, these legal instruments have not yet fully achieved high levels of compliance due to various obstacles encountered during implementation.

These findings demonstrate that the effectiveness of oversight cannot be measured solely by the number of field inspections or annual reports. Oversight is considered effective if it can prevent pollution through early detection of potential violations, increase business compliance, and ensure that each violation is promptly, proportionally, and fairly followed up. Therefore, the success of oversight must be measured by its impact on environmental quality, not solely by the number of administrative activities carried out by supervisory officials.

The analysis also shows that environmental oversight still faces a number of structural and technical challenges. Institutionally, the number of environmental supervisory officials is not commensurate with the number of industrial activities that must be monitored. This situation results in uneven monitoring intensity across regions, resulting in some businesses receiving routine oversight, while others are only investigated upon public complaints or after suspected pollution. This imbalance has the potential to create gaps in law enforcement, as the

effectiveness of oversight is significantly influenced by the government's ability to conduct ongoing monitoring.

In addition to limited human resources, monitoring is also affected by limited supporting facilities and infrastructure. Environmental monitoring in the modern industrial era requires adequate environmental laboratories, real-time water and air quality monitoring systems, the use of digital technology, and data integration between the central and regional governments. Without these facilities, the process of identifying violations is often slow, resulting in corrective action only after pollution has already impacted communities and ecosystems. This situation demonstrates that the effectiveness of monitoring depends not only on the existence of regulations but also on the capacity of the institutions carrying out these oversight functions.

These issues demonstrate that the effectiveness of environmental oversight is influenced not only by the technical aspects of implementation, but also by the quality of good environmental governance. Effective oversight requires strong coordination between the central government, local governments, technical agencies, environmental laboratories, and public participation in providing information regarding suspected pollution. If this coordination is not optimal, the oversight process tends to be partial and less able to provide a rapid response to potential environmental violations. Therefore, environmental oversight must be viewed as a system involving various stakeholders, not solely the responsibility of supervisory officials.

Normatively, Law Number 32 of 2009 has provided a fairly strong legal basis for the implementation of environmental supervision. The provisions in Article 71 emphasize that the Minister, governor, or regent/mayor, in accordance with their authority, are required to supervise the compliance of those responsible for businesses and/or activities with the provisions of laws and regulations in the field of environmental protection and management. This provision indicates that supervision is a legal obligation that must be implemented continuously, not merely an authority that can be exercised incidentally. Furthermore, Articles 72 through 75 regulate the appointment of environmental supervisory officials, the authority to conduct inspections, request information, enter business premises, take samples, examine documents, and compile minutes as a basis for further law enforcement. Thus, legally, Indonesia has adequate supervisory instruments to ensure business actors' compliance with environmental management obligations.

However, research results indicate that the implementation of these provisions has not fully proceeded as expected. In practice, supervision still faces various obstacles, including the limited number of environmental supervisory officers, the vast area of supervision, the high number of industrial activities, and limited operational budgets. These conditions mean that the frequency of supervision is not always commensurate with the level of pollution risk posed by each industrial activity. As a result, some violations are only identified after public complaints or after pollution has impacted the surrounding environment. This fact indicates a gap between legal norms (*das sollen*) and legal implementation (*das sein*), so that the preventive objectives of supervision have not been fully achieved.

Furthermore, changes in licensing governance through the Risk-Based Approach (RBA) within the Online Single Submission (OSS) system also have consequences for environmental oversight patterns. The risk-based licensing system facilitates low-risk business activities, but at the same time requires the government to improve the quality of oversight of business

activities that pose moderate to high risks to the environment. Therefore, the oversight paradigm is no longer solely oriented towards administrative inspections of permits, but must instead be based on the level of pollution risk that an industrial activity may pose. This approach allows limited oversight resources to be more effectively directed to sectors with the greatest pollution potential, thereby simultaneously realizing the principles of efficiency and effectiveness in law enforcement.

When analyzed using the theory of legal effectiveness proposed by Soerjono Soekanto, this condition indicates that the success of law enforcement is influenced by five factors: legal factors, law enforcement officers, facilities and infrastructure, the community, and legal culture. In the context of this research, legal factors can be said to have provided a sufficient normative basis through regulations regarding environmental management obligations, oversight mechanisms, and the types of sanctions that can be applied to business actors. However, the existence of comprehensive regulations cannot produce effective law enforcement if it is not accompanied by the readiness of supervisory officers, the adequacy of supporting facilities, and the growth of a culture of compliance with environmental law. In other words, the main problem lies not in the substance of the law, but in the implementation factors that determine how the legal system works in practice.

This view is reinforced by Lawrence M. Friedman's legal system theory, which explains that the functioning of a legal system is determined by three main elements: legal substance, legal structure, and legal culture. From a legal substance perspective, Indonesia already has various regulations that comprehensively govern environmental protection and management. However, from a legal structure perspective, the institutional capacity of supervisors still needs to be strengthened, either through increasing the number of supervisory officials, developing technical competencies, providing environmental laboratories, or utilizing digital monitoring technology. Meanwhile, from a legal culture perspective, some business actors still view environmental management obligations as a burden on production costs, so that compliance is driven more by fear of sanctions than by awareness of preserving the environment. The imbalance between these three elements has resulted in the effectiveness of environmental law enforcement being unable to achieve the goals envisioned by lawmakers.

Thus, the effectiveness of oversight depends not only on the existence of sound legal norms, but also on the institution's ability to implement those norms consistently, transparently, and accountably. The stronger the synergy between legal substance, oversight institutions, and a culture of public compliance, the greater the opportunity to create an environmental law enforcement system capable of effectively and sustainably preventing industrial waste pollution.

The results of this study reinforce the findings of García, Sterner, and Afsah (2007), who explained that transparency of information regarding corporate environmental performance through the Corporate Performance Rating Program (PROPER) can improve business compliance without always relying on a repressive approach. According to García et al. (2007), public information disclosure creates a reputational pressure mechanism, namely social pressure that encourages companies to improve environmental management to maintain their image and public trust. These findings indicate that the effectiveness of supervision is determined not only by the frequency of field inspections, but also by the government's ability to build an environmental information system that is transparent, accountable, and easily accessible to the public. In the Indonesian context, the existence of PROPER has been an important innovation in strengthening environmental oversight, but its effectiveness still

needs to be improved by updating assessment indicators, expanding company coverage, and strengthening follow-up for companies that receive low ratings.

The findings of this study are also in line with a report by the Organization for Economic Co-operation and Development (OECD, 2009), which emphasizes the importance of implementing risk-based inspection in environmental monitoring systems. The OECD explains that supervision can no longer be carried out with the same approach for all business activities, but must instead consider the level of pollution risk posed by each industrial sector. A risk-based approach allows the government to focus oversight resources on industries with the greatest potential environmental impact, thereby making oversight more efficient and effective. The results of this study indicate that this concept is highly relevant for implementation in Indonesia, given the limited number of supervisory officials, the vast area of supervision, and the increasing number of industrial activities each year. By implementing risk-based supervision, the government can optimize available resources to prevent pollution before it causes wider environmental damage.

Research by Gupta, Saksena, and Baris (2019) in India also yielded results consistent with this study. Gupta et al. found that increased monitoring intensity coupled with consistent law enforcement significantly increased industry compliance with environmental standards. Conversely, weak monitoring led companies to neglect waste management obligations due to the low likelihood of violations being detected by authorities. These findings indicate that business compliance is influenced not only by the severity of sanctions stipulated in laws and regulations, but also by the level of certainty that any violations will be discovered and followed up by the government. Thus, the effectiveness of monitoring has a greater influence on compliance behavior than the mere threat of sanctions.

The results of this study also support research by Chakraborti (2022), which shows that law enforcement measures in the form of inspections, administrative sanctions, and environmental fines have a positive effect on improving corporate compliance in Mexico. However, Chakraborti emphasized that the effectiveness of sanctions is greatly influenced by the consistency of their implementation. If sanctions are only applied to a portion of business actors or are implemented inconsistently, the deterrent effect will be weakened because companies perceive the risk of violation as being smaller than the economic benefits obtained. This condition is strongly relevant to the results of this study, where weak oversight results in the implementation of sanctions not being a full deterrent, resulting in continued violations of environmental regulations across various industrial sectors.

Furthermore, the United Nations Environment Programme (UNEP, 2019) emphasized that weak law enforcement is one of the main causes of poor environmental quality in various developing countries. According to UNEP, the success of environmental protection is determined not only by the number of regulations a country has, but more so by institutional capacity, the integrity of law enforcement officials, inter-agency coordination, public participation, and the availability of an accurate and transparent environmental information system. These findings further strengthen the research findings that the greatest challenge to environmental law enforcement in Indonesia lies not in the lack of legal instruments, but rather in strengthening implementation and oversight governance.

While similar to previous studies, this study offers a different perspective. García et al. (2007) emphasized the influence of information disclosure on corporate compliance, the OECD (2009) focused on risk-based supervision, Gupta et al. (2019) highlighted the

relationship between supervision intensity and industry compliance, and Chakraborti (2022) emphasized the effectiveness of sanctions as a deterrent. This study integrates all these aspects into a single analytical framework, demonstrating that effective environmental law enforcement can only be achieved if supervision, business compliance, and the application of sanctions operate synergistically. Therefore, this study does not view these three aspects as stand-alone variables, but rather as a system that influences each other in realizing environmental protection and management.

Based on the overall analysis, it can be emphasized that supervision is the entry point for effective environmental law enforcement. Professional, consistent, and risk-based supervision will increase business compliance, thereby minimizing the need for sanctions. Conversely, weak supervision leads to low compliance, increases the frequency of violations, and encourages law enforcement that is more repressive than preventive. Therefore, strengthening the supervisory system must be a top priority in environmental protection and management policies.

The implications of this research indicate that the government needs to strengthen the institutional capacity of environmental supervisors by increasing the number and competence of supervisory officials, utilizing digital technology in environmental quality monitoring, developing a risk-based monitoring system, optimizing environmental laboratories, and improving coordination between the central and regional governments. Furthermore, the involvement of the community, academics, the media, and environmental organizations needs to be continuously encouraged as a form of participatory environmental governance, thereby creating a public oversight mechanism for business compliance. Through this synergy, environmental law enforcement will not only function as an instrument for taking action against violations, but also as a means of building a culture of compliance, realizing environmental justice, and ensuring the sustainability of environmentally conscious development.

IV. Conclusion

The effectiveness of environmental law enforcement against industrial waste pollution is not entirely determined by the existence of comprehensive regulations, but is more influenced by the quality of supervision implementation, the level of compliance of industrial actors, and the consistency of sanction application as a whole law enforcement system. Suboptimal supervision results in the law's preventive function not functioning optimally, resulting in variable compliance among business actors and a tendency for repressive sanctions to be applied after pollution occurs. This situation indicates that strengthening environmental law enforcement is not sufficient through regulatory improvements but must be accompanied by increased institutional capacity of supervisors, the implementation of risk-based and technology-based supervision, strengthening the culture of compliance among business actors, and the application of sanctions that are consistent, proportional, and oriented towards environmental recovery. Therefore, the effectiveness of environmental law enforcement can only be achieved through a synergy between effective supervision, industrial actor compliance, and the fair enforcement of sanctions to ensure the realization of sustainable environmental protection and management.

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