RISET :
Jurnal Ilmiah Multidisiplin Ilmu
Published by PT. Ahlal Publisher Nusantara, Indonesia
Volume 1 No 3 April 2026 E-ISSN : 3123-8475
Journal Homepage: https://jurnalriset.com/index.php/riset/index

Theoretical and Juridical Study of Environmental Pollution Crimes in the Mining Sector

Safera Dey Woi[1]*, Diana D. Putong[2], Feibe E. Pijoh[3]
[1]Master of Law Program, Postgraduate Faculty, Universitas Negeri Manado, Indonesia
[2]Faculty of Law, Universitas Negeri Manado, Indonesia
Email : saferawoi18@gmail.com

Article Info

Corresponding Author:
Penulis Korespondensi
✉ saferawoi18@gmail.com

History:
Submitted: 17-04-2026
Revised: 18-04-2026
Accepted: 18-04-2026

Keywords: environmental pollution, mining sector, theoretical criteria, juridical criteria, criminal liability, environmental justice

Kata Kunci: pencemaran lingkungan, sektor pertambangan, kriteria teoretis, kriteria yuridis, pertanggungjawaban pidana, keadilan lingkungan

https://doi.org

Abstract

Indonesia as a constitutional state mandates the protection of environmental quality, particularly in the mining sector which often causes significant pollution. This study aims to analyze the criteria of environmental pollution elements from theoretical and juridical perspectives, and to examine their application in handling mining sector pollution cases. Using normative legal research with statutory, conceptual, and comparative approaches, this study compares theoretical concepts (ecological, ethical, and philosophical) with positive law provisions under Law No. 32 of 2009 on Environmental Protection and Management. The findings reveal a fundamental discrepancy: theoretically, pollution is determined by ecological disruption and harm to ecosystems or human health, while juridically, pollution is strictly defined by exceeding pre-determined environmental quality standards (baku mutu). This disharmony is evident in the PT Newmont Minahasa Raya (Buyat Bay) case, where despite evident ecological damage and public health impacts, the court acquitted the defendants because laboratory results showed pollutant concentrations remained below the formal quality standards. The study concludes that the narrow juridical approach creates legal loopholes allowing actual polluters to escape criminal liability. Recommendations include revising Law No. 32/2009 to incorporate ecological impact criteria beyond rigid quality standards, and adopting a more holistic judicial approach that balances legal certainty with environmental justice.

Abstrak

Indonesia sebagai negara hukum mengamanatkan perlindungan kualitas lingkungan, khususnya di sektor pertambangan yang sering menyebabkan pencemaran besar. Penelitian ini bertujuan untuk menganalisis kriteria elemen pencemaran lingkungan dari perspektif teoretis dan yuridis, serta mengkaji penerapannya dalam penanganan kasus pencemaran sektor pertambangan. Dengan menggunakan penelitian hukum normatif dengan pendekatan perundang-undangan, konseptual, dan komparatif, penelitian ini membandingkan konsep-konsep teoretis (ekologis, etis, dan filosofis) dengan ketentuan hukum positif yang diatur dalam Undang-Undang No. 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup. Hasil penelitian mengungkapkan adanya ketidaksesuaian mendasar: secara teoretis, pencemaran ditentukan oleh gangguan ekologi dan kerusakan terhadap ekosistem atau kesehatan manusia, sedangkan secara yuridis, pencemaran secara ketat didefinisikan dengan melebihi standar kualitas lingkungan yang telah ditentukan (baku mutu). Ketidaksesuaian ini tercermin dalam kasus PT Newmont Minahasa Raya (Teluk Buyat), di mana meskipun terdapat kerusakan ekologis dan dampak kesehatan masyarakat yang nyata, pengadilan membebaskan terdakwa karena hasil laboratorium menunjukkan konsentrasi polutan berada di bawah baku mutu formal. Penelitian ini menyimpulkan bahwa pendekatan yuridis yang sempit menciptakan celah hukum yang memungkinkan pelaku pencemaran yang sebenarnya untuk lolos dari pertanggungjawaban pidana. Rekomendasi penelitian ini adalah revisi Undang-Undang No. 32/2009 untuk memasukkan kriteria dampak ekologis selain standar kualitas yang kaku, serta mengadopsi pendekatan yudisial yang lebih holistik yang seimbang antara kepastian hukum dan keadilan lingkungan.

1. Introduction

Indonesia, as a state based on law (rechtsstaat), places environmental protection as a constitutional mandate. Article 28H paragraph (1) of the 1945 Constitution recognizes the right to a good and healthy environment, while Article 33 paragraph (3) states that the earth, water, and natural wealth are controlled by the state and used for the greatest prosperity of the people. These provisions establish Indonesia as a "green constitution" (Absori et al., 2022).

The mining sector is a strategic pillar of national economic development; however, it frequently causes serious environmental problems. Pollution from both legal and illegal mining activities has directly impacted ecosystems, public health, and the socio-economic life of surrounding communities. Law No. 32 of 2009 on Environmental Protection and Management (UUPPLH) criminalizes environmental pollution, defining it in Article 1(14) as "the entry or introduction of living organisms, substances, energy, and/or other components into the environment by human activities so that it exceeds the established environmental quality standards."

A critical issue arises when comparing this legal definition with ecological theories. For instance, Otto Soemarwoto (1989) argues that ecological pollution occurs only when two conditions are met: (1) a substance or organism enters the environment, and (2) it consequently hinders or disrupts the function or allocation of that environment. Without the second condition, only contamination occurs. This theoretical approach requires an actual adverse effect, whereas Indonesian positive law does not require proof of harm—only the exceeding of quality standards.

This divergence creates significant challenges in prosecuting mining pollution cases. Therefore, this research addresses two main questions: (1) What are the criteria for environmental pollution elements from theoretical and juridical perspectives? (2) How are these criteria applied in handling mining sector pollution cases?

2. Research Method

This study employs normative legal research (legal research) using a statute approach (Law No. 32/2009, Law No. 3/2020 on Mineral and Coal Mining), a conceptual approach (examining theories of legal aims, environmental justice, criminal liability, and evidence), and a comparative approach (comparing theoretical and juridical elements). Primary legal materials include the 1945 Constitution, Law No. 32/2009, and Law No. 3/2020. Secondary materials consist of legal literature, scholarly articles, and court decisions, particularly the Manado District Court Decision No. 284/Pid.B/2005/PN.Mdo regarding PT Newmont Minahasa Raya. Data were analyzed qualitatively using deductive logic.

3. Results and Discussion

3.1 Criteria of Environmental Pollution Elements: Theoretical vs. Juridical

3.1.1 Theoretical Criteria

From an ecological and philosophical perspective, environmental pollution is understood as a form of wrongdoing that disrupts the harmony between humans and their environment. Based on the synthesis of experts (Soemarwoto, 1989; Harun M. Husein, 1995; N.H.T. Siahaan, 2008), the theoretical elements of pollution include:

1. **Act (actus reus):** Any human action (active or passive) that introduces pollutants into the environment.
2. **Object:** All ecosystem components (air, water, soil, flora, fauna, human health).
3. **Adverse effect:** Decrease in environmental quality, disruption of ecological

balance, loss of biodiversity, or harm to human health.
4. **Causality:** A causal link between the act and the ecological harm, which may be direct or indirect.
5. **Moral culpability:** Recognizing negligence and even strict liability for ecological justice.

Notably, theoretical criteria do not require a numerical threshold; pollution is deemed to occur whenever the environment's carrying capacity is exceeded, regardless of whether formal quality standards have been violated.

3.1.2 Juridical Criteria (Under Law No. 32/2009)

Article 1(14) of UUPPLH defines pollution strictly through the following elements:

1. **Act:** Entry or introduction of living organisms, substances, energy, and/or other components into the environment.
2. **Source:** Human activities.
3. **Threshold:** Exceeding the established environmental quality standards (baku mutu) for air, water, or soil.

Crucially, the juridical definition does **not** require proof of actual harm or disruption to the ecosystem. As long as the measured pollutant concentration exceeds the standard, the act qualifies as pollution—even if no fish die and no human falls ill. Conversely, if the concentration remains below the standard, even mass fish deaths and human diseases do not constitute legal pollution.

This is a **formal-material delict** (delik materiel) in form but with a unique twist: the prohibited act itself is "exceeding quality standards," not "causing harm." This differs fundamentally from theoretical ecology.

3.1.3 Comparison Table

Aspect	Theoretical Elements	Juridical Elements (Law No. 32/2009)
Definition	Disruption of ecosystem function or carrying capacity	Entry of substances exceeding quality standards
Required consequence	Actual harm (ecological, health, economic)	Only exceeding standards (harm not required)
Basis	Ecological science, ethics	Positive law, legal certainty

Aspect	Theoretical Elements	Juridical Elements (Law No. 32/2009)
Measurement	Functional impairment of environment	Laboratory testing against baku mutu
Scope	Broad (ecosystem, future generations)	Narrow (parameter-specific)
Weakness	Difficult to measure concretely	Can ignore real ecological damage

3.2 Case Study: PT Newmont Minahasa Raya (Buyat Bay)

3.2.1 Factual Background

PT Newmont Minahasa Raya (PT NMR), a gold mining company, began production in 1996 and discharged tailings via a pipeline into Buyat Bay, North Sulawesi. Daily, 2,000 tons of tailings were released at 82 meters depth, 900 meters from shore. Subsequently, local fishermen reported mass fish deaths, drastically reduced catches, and mysterious illnesses among residents (skin rashes, headaches, nausea, swelling, fainting). Sedimentation from tailings covered seagrass beds and coral reefs.

Government investigations produced conflicting results. A 1999 independent team found heavy metal pollution, but PT NMR denied this. The CSIRO (Australian research agency) and a joint government team concluded that heavy metal concentrations remained below safety thresholds. However, an internal Newmont audit (revealed by the New York Times) disclosed that 33 tons of mercury intended for collection were released—17 tons into the air and 16 tons into Buyat Bay.

3.2.2 Court Decision

The Manado District Court (Decision No. 284/Pid.B/2005/PN.Mdo) acquitted PT NMR and its director, Richard Ness. The court held that:

- Laboratory results from the National Police Forensic Laboratory showed metal concentrations (arsenic, mercury) in water, sediment, biota, and human hair remained below the Ministry of Environment's quality standards.
- Tailings were not classified as hazardous waste and had been detoxified.
- The discharge complied with the approved AMDAL (environmental impact assessment).

3.2.3 Analysis of Discordance

The following table illustrates the critical mismatch between theoretical and juridical assessments:

Aspect	Theoretical Assessment	Juridical Assessment (Court)	Discordance
Object	Ecosystem + public health (skin diseases, tumors, neurological disorders)	Only physico-chemical parameters of seawater/sediment	Theory: broad; Juridical: narrow
Act	Discharge causing real harm (fish death, illnesses)	No proven exceedance of quality standards	Theory: effect-based; Juridical: threshold-based
Causality	Strong circumstantial evidence (temporal and spatial correlation)	No absolute scientific proof linking tailings to diseases (alternative causes: malaria, malnutrition)	Theory: balance of probability; Juridical: absolute causation
Justice	Ecological justice demands accountability for actual harm	Formal legal certainty prevails despite community suffering	Theory: substantive; Juridical: procedural

This case demonstrates that under the current juridical framework, even massive ecological damage may escape criminal sanctions if formal quality standards are not exceeded. The precautionary principle and the "polluter pays" principle are effectively nullified by rigid evidentiary requirements.

3.3 Theoretical Underpinnings of the Discordance

3.3.1 Theory of Legal Aims (Gustav Radbruch)

Radbruch prioritized justice, then expediency, then legal certainty. In the Buyat case, the court prioritized legal certainty (strict adherence to quality standard numbers) over substantive justice (the community's actual suffering). This inversion violates the priority order and undermines the very purpose of environmental law.

3.3.2 Theory of Environmental Justice

Environmental justice comprises distributive, corrective, procedural, and social dimensions (Kuehn; Langhelle). The Buyat case failed on all dimensions: the community bore disproportionate environmental risks (distributive injustice); the polluter was not required to remedy harm (corrective injustice); the community's voice was marginalized (procedural injustice); and poverty alleviation was ignored (social injustice).

3.3.3 Theory of Criminal Liability

Indonesian criminal law requires both actus reus and mens rea. However, environmental crimes often involve complex chains of causation and latent effects. The court's demand for absolute causation—requiring direct, laboratory-proof links between tailings and each disease—is practically impossible in environmental cases. The strict liability provision (Article 88 UUPPLH) was not effectively applied, even though tailings containing mercury and arsenic clearly pose high risks.

3.4 Implications for Mining Sector Enforcement

The dissonance between theoretical and juridical pollution criteria creates several legal gaps:

1. **Regulatory loophole:** Companies can operate within quality standards while causing cumulative, long-term ecological degradation.
2. **Evidentiary impossibility:** Requiring absolute scientific proof ignores the limitations of environmental monitoring and latency periods.
3. **Deterrence failure:** Acquittals in high-profile cases signal weak enforcement, encouraging non-compliance.
4. **Access to justice barriers:** Affected communities cannot rely on formal standards that fail to capture real harm.

4. Conclusion

First, the criteria for environmental pollution elements differ fundamentally between theoretical and juridical perspectives. Theoretically, pollution is determined by actual disruption to ecosystem function, carrying capacity, and human health—without necessarily requiring a numerical threshold. Juridically, under Law No. 32/2009, pollution is strictly defined as the entry of substances exceeding pre-determined environmental quality standards (baku mutu), with no requirement to prove actual harm.

Second, this disharmony leads to legal failures in mining pollution cases, as demonstrated by the PT Newmont Minahasa Raya (Buyat Bay) case. Despite clear ecological damage, public health impacts, and economic losses, the court acquitted the defendants because laboratory results showed pollutant concentrations remained below formal quality standards. The narrow, formalistic juridical approach overrides substantive environmental justice.

Third, to achieve effective enforcement, harmonization is urgently needed. Law No. 32/2009 should be revised to incorporate ecological impact criteria, allowing courts to consider actual ecosystem disruption alongside quality standards. Judges should adopt a more holistic approach, balancing legal certainty with the precautionary principle and environmental justice.

5. Recommendations

1. **Legislative revision:** Amend Law No. 32/2009 to add "significant ecological impact" as an alternative trigger for criminal liability, not solely reliance on baku mutu. Incorporate the carrying capacity concept from ecological theory.
2. **Judicial guidance:** The Supreme Court should issue a circular letter (SEMA) directing judges to consider ecological and public health evidence even when formal quality standards are technically met, applying the precautionary principle.
3. **Evidentiary reform:** Relax causation requirements in environmental cases, adopting the "balance of probabilities" standard rather than absolute scientific certainty, consistent with strict liability principles.
4. **Strengthened monitoring:** Enhance environmental laboratory capacity and independent monitoring to ensure quality standards reflect actual ecological thresholds, not merely political or economic compromises.
5. **Community participation:** Guarantee procedural environmental justice by strengthening community rights to participate in AMDAL processes, access information, and seek judicial review.

References

Absori, A., Yulianingrum, A.V., Hasmiati, R.A., & Budiono, A. (2022). Government Policies for the Natural Resource Management of Minerals and Coal Based on Social Welfare. *Pena Justisia*, 20(1).

Chazawi, A. (2002). *Pelajaran Hukum Pidana bagian I*. Raja Grafindo Persada.

Danusaputro, M. (2018). *Hukum Lingkungan: Buku I, Umum*. Binacipta.

Husein, H.M. (1995). *Lingkungan Hidup, Masalah, Pengelolaan dan Penegakan Hukumnya*. Bumi Aksara.

Marzuki, P.M. (2010). *Penelitian Hukum*. Kencana.

Moeljatno. (2015). *Asas-Asas Hukum Pidana*. Rineka Cipta.

Renggong, R. (2018). *Hukum Pidana Lingkungan*. Prenada Group.

Santosa, M.A. (2020). *Good Governance dan Hukum Lingkungan*. ICEL.

Siahaan, N.H.T. (2008). *Hukum Lingkungan Edisi Revisi*. Pancuran Alam.

Soemarwoto, O. (1989). *Ekologi, Lingkungan Hidup dan Pembangunan*. Djambatan.

Manado District Court Decision No. 284/Pid.B/2005/PN.Mdo.

Law No. 32 of 2009 on Environmental Protection and Management.

Law No. 3 of 2020 on Amendment to Law No. 4 of 2009 on Mineral and Coal Mining.