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Auditing of Environmental Management in Industrial Zones of Vietnam Case Study of Industrial Zones in Lao Cai Province

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ABSTRACT

Vietnam is a developing country with an economic growth rate among the top in Asia, therefore facing pressures from industrialization, urbanization, and population growth means that the amount of waste also increases. In the face of current environmental issues, an environmental audit is considered a tool to provide information about the environment, and a basis for assessing the possibility of environmental risks caused by enterprises, the environmental obligations of the business, as well as the degree of satisfaction with environmental standards or regulations. Besides, an environmental audit is also one of the supporting tools for harmoniously solving the relationship between economic development and environmental protection, contributing to raising the awareness of individuals and production organizations in sustainable environmental protection. The article focuses on analyzing and evaluating the current status of environmental management in industrial zones in Lao Cai province based on content and audit criteria for the period 2017-2020. From there, it proposes some recommendations to improve the efficiency of environmental management and protection in Lao Cai in the coming time.

Keywords: environmental audit, environmental protection, industrial park, Lao Cai

INTRODUCTION

Lao Cai is a mountainous province, bordering the Northwest region of Vietnam, however, thanks to its favorable geographical position, inter-regional transportation system, rich and abundant natural resources, etc., it has created potential and advantages for Lao Cai to attract investment for comprehensive socio-economic development. In the first six months of 2021, the highlight among them was industrial development because statistics of the Department of Industry and Trade of Lao Cai province (2021) showed that the industrial production value

(comparative price in 2010) reached 18,764.2 billion VND, up 12% over the same period in 2020. Notably, the development of the processing and manufacturing industry such as the production of yellow phosphorus, fertilizers, and phosphoric acid has increased output. In addition, the province's handicraft production value reached 2,976.2 billion VND due to the interest in developing and promoting the efficiency of industrial promotion capital.

Currently, there are three operating industrial zones (IZs) in Lao Cai province, including Bac Duyen Hai Industrial Park, Dong Pho Moi Industrial Park, Tang Loong Industrial Park, and Kim Thanh Industrial Park - a newly announced industrial park in 2020. Notably, the occupancy rate of 3 operating industrial parks is over 85%, and the Kim Thanh zone is above 50%. Three areas are operating with a total area of 1,285 hectares, and 12 industrial clusters with a total area of 145.67 hectares. In the coming time, the province will create conditions for the development of supporting industries as well as help small and medium enterprises in the province. It needs to accelerate the implementation of planning on industrial zones and clusters to create clean premises to attract investment.

Presently, the technical infrastructure for environmental protection in industrial zones in Lao Cai province has not been invested in and built synchronously, especially since there is no centralized wastewater treatment system. The planning of construction of industrial zones has not yet complied with regulations; some production, business, and service establishments have not strictly complied with regulations on environmental protection, especially Tang Loong Industrial Park. Therefore, the study "*Auditing of environmental management in industrial zones in Lao Cai province*" is necessary and urgent in both theory and practice. The audit will help evaluate the roles and responsibilities of state management agencies, production, and business establishments in environmental protection, thereby clarifying shortcomings, and limitations and making recommendations to enhance public management, environmental protection, as well as minimizing the risk of causing environmental pollution for economic and industrial zones in Lao Cai province.

RESEARCH OVERVIEW

In the world, an environmental audit is always considered an optimal tool and is widely applied in many countries in order to check and evaluate the implementation of regulations in the field of environmental management and protection, or international standards on environmental management like ISO 14001 standard (S. Heras, O. Boiral, E. Allur, 2018). According to the World Bank (WB), "*EIA is a method of examining environmental information about an organization, facility or website to verify data, or to some extent, they are subject to specific audit criteria*". The criteria can be based on local, national, or global environmental standards. Therefore, it is a systematic process of collecting and evaluating the information on environmental aspects (ASOSAI, 2013, p.9).

Countries around the world such as the US, Australia, the UK, the countries of the European Union, New Zealand, and Canada are leaders in this field. In reality, the application of environmental audits can be done in many forms, including voluntary and compulsory, internal or independent audits. Content and standards of audit, especially voluntary or internal audits can be flexibly developed, depending on the different purposes and needs of enterprises, production facilities, and business organizations. Most audit programs can be defined based on

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legal regulations, environmental criteria, or other standards such as Global GAP and ISO 14001 (E. Wall, A. Weersink, & C. Swanton, 2001).

Some major programs on environmental management apply audit tools such as The Ontario Farm Environmental Plan - EFP (Canada, 1992), The UK Linking Environment and Farming program - LEAF (Squire, 2013) (J. Mills, N. Lewis, and J. Dwyer, 2010), The National Association of Sustainable Agriculture Australia (NASAA, 2018), Eco-Management Audit Scheme - EMAS (T. Feldman, 1996).

In many countries around the world, the Supreme Audit Institutions (SAIs) with their important role need to participate in this field to ensure that natural resources are managed, exploited, and used effectively. INTOSAI's Working Group on Environmental Audit (WGEA) was established at the 14th Congress (Wasington D.C, USA, 1992) with 12 SAVs founding members. Currently, the number of members has increased to more than 70 and has become the largest working group of INTOSAI, chaired by the Estonian State Audit, the State Audit of Vietnam has joined as a member of this Working Group. In addition, the ASOSAI Working Group on Environmental Audit was also founded at the 8th Congress (Chiengmai, Thailand, 2000) with 31 members, including Vietnam.

In Vietnam, environmental audit activities have been recognized by state management agencies as an effective environmental management tool and encouraged to be promoted and implemented (Clause 7, Article 6, Law on Environmental Protection, 2014). Environmental audit activities in Vietnam currently focus heavily on waste audits, for example, Van Diem Paper Factory, Hoang Van Thu Paper Factory, Dong Nai Paper Company, Viet Tri Chemical Factory, Capital Brewery, Factory Southeast Asia Beer, etc (T. T. Trinh, T. H. Nguyen, 2003), and some other audit contents such as the audit of the environmental management system at Trung Son - Hung Yen Food Joint Stock Company (2014), audit of environmental impacts at Nui Seu quarry (T. V. A. Pham, D. K. Nguyen, 2016), Nam Dinh Textile company (T. V. A. Pham, V. T. Hoang, 2017), Khe Giang domestic solid waste treatment plant, city Uong Bi (2019), energy audit at Faculty of Science - Can Tho University (M. T. Dinh, 2012), Bitis Lao Cai Trade Center (H. Ba, 2011), Ho Chi Minh City energy saving programs (H. P. Pham, 2007), (Y. Millet, 2011).

Since 2008, after becoming a member of the Working Group on Environmental Audit of Asian Organization of Supreme Audit Institutions (ASOSAI), the State Audit of Vietnam has researched, established the apparatus, and piloted the environment audits, including the content of environmental audit in the action plan to implement the State Audit Development Strategy until 2022. Statistics show that, from 2010 to now, the State Audit has carried out an average of 5 environmental audits per year, with topics ranging from forest, land, and clean water management to waste management, mining, and, recently, low-carbon metabolism. This is an important step forward in the operation of the State Audit with the approach of developing new types and fields of audit following international trends and practices.

RESEARCH METHODS

The research team mainly uses statistical-descriptive, statistical-comparative methods to analyze and evaluate environmental management activities in industrial zones in Lao Cai province in the period 2017-2020 according to the contents and audit criteria.

The data system is provided by audited units, including the Department of Natural Resources and Environment of Lao Cai Province, Economic Zone Authority of Lao Cai Province, and, comparative audit units. The figures are directly investigated by the Auditing Group on environmental management activities - State Audit Region VII.

RESEARCH RESULTS

Overview of industrial parks and environmental management in industrial zones in Lao Cai province

Lao Cai is a mountainous province, bordering the Northwest region of Vietnam, with a favorable geographical position, inter-regional transportation system, and rich and diverse natural resources. All have created the potential for Lao Cai to attract investment for comprehensive socio-economic development, notably in industrial fields. Here is some information about industrial zones (IZ) in Lao Cai province.

(1) Bac Duyen Hai Industrial Park

- Decision approving the adjustment of detailed planning No. 1023/QD-UBND dated May 11, 2012, of Lao Cai Provincial People's Committee on the adjustment of detailed construction planning of 1/2000 scale was approved by the Prime Minister to convert from an industrial cluster to an industrial zone in Document No. 834/TTg-KTN dated May 19, 2016.
- Total area is 850,000 m2 (85 hectares), of which land planned for the industry is 61.85 hectares. The Economic Zone Authority of Lao Cai province has handed over to the People's Committee of Lao Cai city to build handicraft production facilities of 12.7 hectares. The area of industrial land under the management of the Economic Zone Authority is 49.15 hectares.
- The occupancy rate of Bac Duyen Hai Industrial Park is 89.8%.
- Types of attractive investment production in the IZ: electronic assembly industry, processing, and manufacturing of consumer and export products such as garments, handicrafts, etc, and storage facilities, goods transshipment warehouse.
- Up to now, the industrial zone has had 64 projects in operation and registered for investment with a total capital of approximately 1,037 billion VND.

(2) Dong Pho Moi Industrial Park

- Decision on the establishment of Industrial Park No. 717/QD-UBND dated March 30, 2009, of the Provincial People's Committee (PCC); The detailed construction planning of Dong Pho Moi Industrial Park of 1/2000 scale had been approved by the People's Committee of Lao Cai province in Decision No. 4099/QD-UBND dated December 25, 2008.
- Total area is 1,000,000 m2 (100 hectares), of which 71.85 hectares are planned for industry, Lao Cai Economic Zone Authority has handed over to the Lao Cai City People's Committee to build 2.2 hectares of handicraft production facilities. The industrial land area managed by the Economic Zone Authority of Lao Cai province is 69.95 hectares.
- The occupancy rate of Dong Pho Moi Industrial Park is 82.47%.
- Types of production that are attractive to invest in the IZ, including factories, production workshops, mechanical assembly, agricultural and forestry machines; workshops for manufacturing and assembling refrigeration electronics, processing agricultural and forest products; a workshop for the production of building materials; goods storages, transit warehouses; other suitable industries;

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Up to now, the IZ has had 42 projects in operation and registered for investment with a total capital of about 1,086 billion VND.

(3) Tang Loong Industrial Park

- It was added by the Prime Minister to the industrial zone development planning in Document No. 1835/TTg-KTN dated October 5, 2009, and accepted in Decision No. 601/QD-UBND dated March 15, 2011, of Lao Cai Provincial People's Committee on the establishment of Tang Loong Industrial Park, Bao Thang district, Lao Cai province. There was detailed planning on the construction of Tang Loong Industrial Park, subdivision scale 1/2000 Decision No. 1881/QD-UBND dated June 22, 2020.
- Total area is 1,100 hectares according to Decision No. 285/QD-UBND dated February 10, 2011, of Lao Cai Provincial People's Committee on approval of detailed planning and adjusting and expanding Tang Loong Industrial Park, scale 1/2000. Of which, the planned land for the IZ is 631.6 hectares.
- The occupancy rate of Tang Loong Industrial Park is 81.69 %.
- Types of production that are attracted to invest in the IZ: metallurgy, mechanics, chemicals, fertilizers, building materials, electricity, electronics, and other suitable industries.
- Tang Loong Industrial Park has attracted 30 registered investment projects, of which 25 projects have been put into stable production and business operations, including 13 fertilizer and chemical factories, 03 metallurgical plants, 01 ore sorting factory, and some ancillary projects. Total investment capital is over 21,800 billion VND.

(4) Kim Thanh Industrial and Commercial Area

- The People's Committee of Lao Cai province approved the detailed planning of the Kim Thanh commercial area for the first time in Decision No. 366/2001/QDUB dated 21 November 2001. Construction planning was adjusted 06 times in 2003, 2006, 2008, 2013, 2014, and 2020 respectively.
- The occupancy rate of Kim Thanh Trade and Industry Zone is 51.88%. The total number of investors in the trade zone is 25 projects.

(5) The implementation of environmental management in industrial zones in Lao Cai province in the period 2017-2020.

- The assessment of environmental records:

The approved environmental documents and permits ensure the full content of environmental impact assessment, environmental protection solutions, and related issues according to guidelines and regulations

The Department of Natural Resources and Environment (DONRE) has submitted to the Provincial People's Committee for approval 05 EIA reports/Environmental Protection Scheme, grant certificates of completion of environmental protection work for 03 projects, issuance of 03 permits for discharging wastewater into water sources and; issued as well as adjusted hazardous waste source owners' books for 11 units in industrial zones in the province; the approval of 20 Environmental Protection Plans by the Economic Zone Authority (EZA). The EZA acts as a member of the council to appraise and approve environmental impact assessment reports for 12 projects.

- Inspection, examination, guidance, and settlement of complaints and denunciations:

Relevant state agencies have taken measures to monitor and supervise the explanation, remedy, and implementation of verification conclusions, inspection, and instructions of violating establishments in a complete and timely manner.

Sectors at all levels have organized 04 rounds of inspection with 64 turns of establishments in industrial zones in the province on the observance of legal regulations on environmental protection, including the Inspector of the Ministry of Natural Resources and Environment (MONRE) organized an inspection in 2017 (for 20 institutions), The General Department of Environment implemented 02 meetings (in 2019: 19 establishments; in 2020: 06 establishments), and The Department of Natural Resources and Environment of Lao Cai province carried out an unexpected inspection in 2018 for 19 facilities in Tang Loong Industrial Park. Annually, the Economic Zone Authority inspects the fields of investment, planning, construction, environmental protection, fire prevention and safety, and labor safety for enterprises under its management according to the work program of the Board.

Basic information about the audit

**** Audit objective***

Evaluate the effectiveness and compliance in environmental management and protection activities of economic zones (EZs) and industrial zones (IZs) of relevant state agencies as well as production, business, and service establishments in Lao Cai province.

Thereby pointing out the shortcomings, limitations, and factors that can negatively affect the environment to propose to the audited units in Lao Cai province to correct the management and operation of the units.

Propose competent authorities to complete inadequate mechanisms and policies; promptly detect violations, clearly define collective and individual responsibilities for handling in accordance with the law.

Provide timely information and data for Party and State leaders in leadership and direction in environmental management and protection.

**** Content and audit criteria***

- Audit content 1: Assessing the implementation of responsibilities for environmental management and protection of industrial zones at relevant state agencies in the period 2017-2020.

+ Auditing Criterion 1: Regarding the promulgation, propaganda, dissemination, and implementation of regulations and guidance on environmental management and protection:
Auditing Criterion 1.1: Relevant state agencies have developed and issued documents, regulations, guidelines, programs, and plans on management and environmental protection fully, timely, and following the legal documents of the state.
Audit Criterion 1.2: Regulations, guidelines, programs, and plans on environmental management and protection have been propagated, disseminated, and implemented fully, promptly, and on schedule.
+ Auditing Criterion 2: Regarding the appraisal and approval of environmental documents

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Auditing Criterion 2.1: The appraisal and approval of environmental records are strictly ensured, in compliance with the prescribed processes and procedures.
Auditing Criterion 2.2: The approved dossiers and environmental permits have sufficient content on EIA, environmental protection solutions, and related issues according to guidelines and regulations.
+ Auditing Criterion 3: Regarding the inspection, guidance, and settlement of complaints and denunciations:

Auditing Criterion 3.1: The inspection, guidance, and settlement of complaints and denunciations have been done regularly and promptly, ensuring the correct processes and procedures with close coordination between the relevant agencies.

Auditing Criterion 3.2: Violations of environmental protection are fully reported to the competent authorities and strictly handled under the law.

Auditing Criterion 3.3: Relevant state agencies should take measures to monitor and supervise the explanation, remedy, and implementation of inspection conclusions and instructions of violating establishments in an adequate and timely manner.
+ Auditing Criterion 4: Regarding monitoring, supervision, and assessment of waste management and treatment activities and, the current environmental status of the IZ
Auditing Criterion 4.1: State agencies build, store and update databases and systems of reports and information on environmental protection, environmental monitoring, and waste management in service observation and monitoring of the current environmental status fully and regularly.

Auditing Criterion 4.2: The shortcomings, limitations, and violations of the law on environmental protection detected through the database system are promptly handled and particularly reflected in periodic, unexpected reports.

Auditing Criterion 4.3: The coordination and information sharing among the management agencies is completely and timely implemented.
+ Auditing Criterion 5: The formulation and adjustment of planning and the implementation of construction and operation of infrastructure systems for environmental protection of the IZ:
Auditing Criterion 5.1: The planning and adjustment work is carried out to ensure compliance with legal regulations.

Auditing Criterion 5.2: The implementation of planning, construction, and operation of environmental protection infrastructure systems (collection works, waste treatment systems, environmental monitoring) in industrial zones [through the form of socialization, private investment, or public investment capital (if any)] was implemented to ensure progress, quality and in accordance with the goals.

- Audit content 2: Assessing the implementation of responsibilities for environmental management and protection of industrial zones at relevant state agencies in the period 2017-2020.

+ Auditing Criterion 1: Regarding the implementation of responsibility for the management and environmental protection at production, business, and service establishments in the EZs and IZs.
+ Auditing Criterion 2: Management and treatment of wastewater; solid waste management and treatment; management and treatment of emissions.

**** Scope, limits, and grounds of audit***

- Audit scope

+ Audited period: Period 2017-2020 and related periods before and after.
+ Audited unit:

Table 1. List of audited and compared units

No	Name of units
I	**General audit unit**
1	Department of Natural Resources and Environment.
2	Economic Zones Authority
II	**Comparative unit**
1	Duc Giang Chemical One Member Co., Ltd
2	Viet Trung Minerals and Metallurgy Co., Ltd
3	DAP 2 Vinachem Joint Stock Company
4	Nam Tien Lao Cai Joint Stock Company
5	Apatit Vietnam Co., Ltd
6	Lao Cai copper refining branch - Vimico

Source: State Audit of Vietnam, 2021

- Audit limits

+ Only audit for environmental protection work based on records and documents provided by the units. The unit is responsible for the legality and correctness of the documents provided to the audit team.
+ Do not audit the financial statements of the units. Failing to conduct detailed audits and confirm investment costs of collection infrastructure works, waste treatment, and environmental monitoring systems that are not built with public investment capital.
+ Do not audit for waste collection and treatment infrastructure system, monitor environment with public investment capital due to the absence of an audit period.
+ For field observation facilities: do not observe for underground or elevated environmental protection works; failing to observe and determine the quality of waste treatment.

- Audit basis

+ Law on State Audit, Law on Public Investment, Law on Environmental Protection, Law on Water Resources and other relevant legal documents; regulations and standards on environmental quality;
+ System of auditing standards, audit process, regulations on organization and operation of the audit team of the State Audit Office;
+ The audit report is prepared based on audit evidence, audit reports, minutes of data confirmation and audit situation of the auditors, and reconciliation minutes at 06 production and business establishments.

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Result of the audit

Audit content 1

Assessing the implementation of responsibilities for management and environmental protection of industrial zones at relevant state agencies in the period 2017-2020

Auditing Criterion 1

Regarding the promulgation, propaganda, dissemination, and implementation of regulatory documents and guiding the implementation of environmental management and protection

* The adjustment of authorization documents is not timely

The Economic Zone Authority is authorized to appraise and certify the Environmental Protection Plan from the People's Committee of Lao Cai City, Muong Khuong District, Bat Xat District, and Bao Thang District for projects within the scope of its assigned management according to Article 19, Decree 18/2015/ND-CP dated February 14, 2015. However, in Decree 40/2019/ND-CP dated May 13, 2019, which took effect from July 1, 2019, regulation on Article 19, Decree 18/2015/ND-CP dated February 14, 2015, was amended, according to that, the authorization content for the certification of environmental protection plans in industrial zones and clusters was not regulated, and at the same time, the provisions guiding the authorization in Decree No. 18/2015/ND-CP and Circular No. 27/2015/TT-BTNMT of MONRE were annulled. Therefore, it is not appropriate for the People's Committee of Lao Cai City, Muong Khuong, Bat Xat, and Bao Thang districts to terminate the implementation of authorization for the Economic Zone Authority to appraise and confirm the Environmental Protection Plan with the provisions of Article 19 of Decree 40/2019/ND-CP dated May 13, 2019. (Currently, the Economic Zone Management Board does not certify the registration of the environmental protection plan).

* Decision No. 3459/QD-UBND dated August 2, 2017, promulgating regulations on coordination in environmental management and protection in Lao Cai province: This is an important and decisive document on the management and coordination mechanism between sectors in the environmental protection work of Lao Cai Provincial People's Committee, but there are still some shortcomings as follows:

- Inadequate and clear on specific responsibilities: assign the Economic Zone Authority as the unit responsible for regularly and comprehensively inspecting and monitoring the implementation of environmental protection contents of the industrial park infrastructure investors and enterprises in IZs in the province, however, the responsibilities of the Economic Zone Authority have not been clearly defined in case of serious environmental pollution incidents in projects under management. Meanwhile, the District People's Committee has a role to coordinate environmental management in IZs but is responsible before the Provincial People's Committee for environmental pollution in the area according to the provisions of the Law on Environmental Protection 2014. At the same time, this can lead to the shifting of responsibilities between agencies.

- The assignment of planning to respond to environmental incidents in industrial zones and clusters by the Provincial People's Committee does not have clear and specific regulations on the unit responsible for the implementation. In the regulations, only the Economic Zone Authority is assigned to monitor and guide the formulation and implementation of plans to prevent and respond to environmental incidents in industrial zones and clusters. Moreover, the District People's Committee is responsible for making and implementing the plan to prevent

and respond to environmental incidents in the area under management, however, the management area of the District People's Committee includes establishments of the IZ in the area but under the management of the Economic Zone Authority, the regulations are not clearly stated. In reality, the Provincial People's Committee assigned the Department of Natural Resources and Environment to assume the prime responsibility for implementing an environmental incident response plan and issued an environmental incident response plan according to Decision No. 726/QD-UBND dated March 24, 2020, of Lao Cai Provincial People's Committee.

* Provincial People's Committee was slow in promulgating an environmental incident response plan, specifically: According to the 2017 coordination regulation, the PPC assigned the EZA to monitor and guide the preparation of a response to environmental incidents in industrial zones and clusters. However, by 2020, the Lao Cai Provincial People's Committee organized a master plan to prevent and respond to environmental incidents in Tang Loong Industrial Park. The delay of the Provincial People's Committee in promulgating the plan to respond to environmental incidents is inconsistent with the provisions of Point c, Clause 2, Article 108 of the Law on Environmental Protection 2014.

Auditing Criterion 2

Regarding the appraisal and approval of environmental dossiers, granting, extension, and revocation of environmental permits and certificates of state agencies for projects in industrial zones

- Industrial zones, when implementing investment, construction, and adjusting the IZ planning without environmental impact assessment, are not consistent with regulations, specifically:
+ Kim Thanh Commercial and Industrial Park issued Decision No. 366/2001/QDUBND dated November 21, 2001, without an environmental impact assessment report, which was not consistent with the provisions of Article 18, Law on Environmental Protection 1993. After 17 years of operation, the Lao Cai Provincial People's Committee approved the environmental protection project (Decision No. 1241/QD-UBND dated April 26, 2018).

+ Dong Pho New Industrial Park established Industrial Park No. 717/QD-UBND on March 30, 2009, without an environmental impact assessment report, which was not justifiable with the provisions of Article 6, Decree No. 80/2006/ND-CP dated 9/8/2006 took effect from 24/8/2006. After 1 year, the unit accepted the environmental protection project (Decision No. 91/QD-TNMT dated March 18, 2010).

According to Article 3 of Circular No. 01/2012/TT-BTNMT dated March 16, 2012, effective from May 2, 2012, the entities are subject to the requirement to make an environmental impact assessment report but fail to do must prepare an environmental protection project. However, the formulation, appraisal, and approval of the environmental protection scheme are still slow compared to the regulations, specifically:
+ Tang Loong Industrial Park approved the Environmental Protection Project, Decision No. 1975/QD-BTNMT dated July 30, 2019, 7 years behind. The reason was that on December 25, 2018, the Economic Zone Authority had just completed and submitted it to the Ministry of Natural Resources and Environment for approval (6 years later), after nearly 7 months, the Ministry of Natural Resources and Environment approved it, 6 months later than the regulation

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at Point a, Clause a, Article 7 of Circular No. 26/2015/TT-BTNMT dated May 28, 2015, of the MONRE.

+ Kim Thanh Industrial and Commercial Zone accepted the environmental protection project under Decision No. 1241/QD-UBND dated April 26, 2018, with 6 years behind. The reason was that on February 7, 2018, the Economic Zone Authority had just completed and submitted it to the PPC for approval (6 years later), after more than 2 months, the Provincial People's Committee approved 38 days later than the provisions at Point a, Clause a of Article. 7 Circular No. 26/2015/TT-BTNMT dated May 28, 2015, of the MONRE.

Auditing Criterion 3

Regarding the work of inspection and examination, and guiding the settlement of complaints and denunciations.

- In the period 2017-2020, in Tang Loong Industrial Park, there were many collective recommendations of households living in the industrial park with the content that manufacturing plants caused the noise, polluted air, polluting waste discharge, and proposed to be moved out of the industrial zone to ensure a long and stable life. The People's Committee of Lao Cai province directed the agencies to review, check and assess the environmental quality and had a plan to move the number of households out of the polluted area. There were 106 households in the relocation plan for 2019-2020, however, by the time of the audit, the entire household has not been moved as planned (71/106 households according to the unit's report).
- Causes: some households were still not satisfied due to the low level of support and the plan of resettlement location, leading to difficulties in completing the dossier, moreover, the families arbitrarily divided land plots as well as changing the purpose of land use from agricultural land to residential land, etc, according to the 2021 plan, it made payment and site clearance for 85/106 households (According to Document No. 836/BC- UBND on December 26, 2020).

- Thematic audit team on environmental management activities conducted interviews with 10 households living near and directly affected by the environment of Tang Loong Industrial Park.

Table 2. Satisfaction with environmental quality in the living area

No	Criteria	Number of households	Proportion (%)
1	Satisfied	0	0%
2	Unsatisfied	4	40%
3	Very unsatisfied	6	60%
4	No ideas	0	0%

Source: State Audit of Vietnam, 2021

The results showed that 100% of the interviewed households were not satisfied with the quality of the environment in the living area, of which 60% of them were "very dissatisfied" and thought that the operation of the IZ had a negative impact on the living environment. In particular, the main cause was the environment of wastewater, exhaust gas, and solid waste generated from the industrial park during its operation.

Table 3. The degree of influence of the operation of the IZs/EZs on the quality of the surrounding environment

No	Criteria	Number of households
1	No effect	0
2	Little effect	0
3	Effect	5
4	Serious effect	5

Source: State Audit of Vietnam, 2021

10/10 of interviewed households found that the water quality of rivers, ponds, and lakes was polluted with black color (sometimes yellow, green), bad smell, dead fish, especially after heavy rains, and the idea of dumping untreated wastewater into the environment.

Table 4. Impact of each type of waste from the IZ/EZ on the surrounding environment Unit: number of households

No	Types of waste from IZs/EZs	No effect	Little effect	Effect	Serious effect
1	Wastewater			10	
2	Solid waste, industrial waste			9	
3	Emissions			10	

Source: State Audit of Vietnam, 2021

- Environmental issues in the IZ were reflected directly by the people or through meetings with voters. Through interviews with 10 households, it was said that people had complained to local authorities about the environmental situation, but these shortcomings were not resolved by the management agencies thoroughly and promptly.

Table 5. The extent to which local authorities respond and handle people's suggestions related to the environmental pollution of IZs/Ezs

No	Criteria	Number of households
5.1	Timely, complete, public	1
5.2	Not timely	6
5.3	Not complete	1
5.4	Not public	

Source: State Audit of Vietnam, 2021

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Audit Criterion 4

Regarding the monitoring, supervision, and assessment of waste management and treatment activities and the current state of the environment of the industrial park

* For monitoring and evaluation of waste management and treatment activities

The Economic Zone Authority did not have a database system, a reporting system, and information on environmental protection, environmental monitoring, and waste management to serve the monitoring and supervision of environmental status.

- For the management of emissions

The audit showed that there were still 06 per 25 enterprises in industrial zones without periodical monitoring reports for the period 2017-2020 to the Department of Natural Resources and Environment, the DONRE had urged the units but the units did not comply with regulations.

- For the management of solid waste, hazardous waste (SW, HW)

Currently, there were 06 per 25 enterprises in 04 industrial zones without making reports on hazardous waste management and treatment to the Department of Natural Resources and Environment, and the DONRE had sent a dispatch to urge businesses (Dispatch No. 492/). STNMT-MT dated March 15, 2017; Official Dispatch No. 2019/STNMT-MT dated September 16, 2019), but the units did not strictly follow the regulations.

- For automatic monitoring system

The Department of Natural Resources and Environment has been responsible for receiving automatic and continuous emission monitoring data (emissions, wastewater) from facilities according to the regulations since 2015. However, until January 2018, the DONRE of Lao Cai had just completed the online automatic monitoring data receiving system and officially received data from May 2018 from the Lao Cai copper refining branch - VIMICO (after more than two years).

On April 26, 2019, the Department of Natural Resources and Environment issued Document No. 805/STNMT-MT requiring some businesses to install a continuous automatic emission monitoring system to urgently complete and transmit data to the DONRE before May 2019. On June 29, 2020, the Department of Natural Resources and Environment issued Document No. 2869/STNMT-BVMT allowing an extension until December 31, 2020, for businesses that had to install automatic monitoring systems. However, by the time of the audit, there were still 04 enterprises that had not yet fully installed automatic monitoring data and transmitted monitoring data to the DONRE for monitoring according to regulations (Vietnam Phosphorus Joint Stock Company with 01 waste source; Lao Cai Yellow Phosphorus Joint Stock Company with 01 waste source; Nam Tien Lao Cai Group Joint Stock Company with 01 waste source; Vietnam Apatite One Member Limited Company with 03 waste sources and installation units short).

During the automatic monitoring process at 04 stations of Vietnam Yellow Phosphorus Co., Ltd., Apromaco Lao Cai Superphosphate Co., Ltd., Lao Cai Southeast Asia Co., Ltd., Duc Giang Chemical Co., Ltd., there were faulty or damaged devices so the Department of Natural Resources and Environment had issued document No. 2869/STNMT-BVMT urging the above businesses to review, repair and replace damaged equipment and to be completed before July 31, 2020. However, up to now, according to the report of the DONRE, the above enterprises

have not been able to fix or repair faulty and damaged automatic monitoring devices *(according to the unit's report, due to the influence of the Covid epidemic, so the repair devices has not been imported).*

* For monitoring and assessment of the current environmental status.
- Air environment: The results of periodic monitoring and inspection of the natural resources and environment monitoring center under the Department of Natural Resources and Environment in the period 2017 - 2020 showed that the dust parameter exceeded the allowable threshold (According to QCVN 05:2013/BTNMT; QCVN 26:2010/BTNMT) from 1.2 to 1.5 times at monitoring times (mainly in Tang Loong Industrial Park), and through inspection records of the General Department of Environment showed that some enterprises had emissions exceeding technical regulations (Viet Trung Minerals and Metallurgical Company Limited had emissions exceeding the technical regulation on waste by 1.5 to less than 02 times; Vietnam Phosphorus Joint Stock Company was by 1.1 to 1.5 times).

- Wastewater environment: Results of checking the periodic monitoring records of the natural resources and environment monitoring center under the DONRE and selecting a sample of 04 periodic environmental monitoring reports of the units (Lao Cai Iron and Steel Factory of Viet Trung Minerals and Metallurgy Co., Ltd., DAP2 – Vinachem JSC., Lao Cai Yellow Phosphate JSC., Apromaco Superphosphate Co., Ltd.) in 2020 showed that water quality in industrial zones still had local pollution in terms of organic matter content in water, specific indicators such as COD, BOD5, TSS, CR6+, NH4+ in Dong Pho Moi, Bac Duyen Hai, and Tang Loong industrial zones exceeded the threshold for permitted (QCVN 08-MT: 2015/BTNMT) from 1.03 to 2.2 times. In Dong Pho Moi Industrial Park, when monitoring on August 5, 2020, pointed out that these parameters exceeded 6 to 19.5 times.

Auditing Criterion No. 5
The formulation and adjustment of planning and the implementation of construction and operation of infrastructure systems for environmental protection of industrial zones

- The adjustment and expansion of the general construction planning of Tang Loong Industrial Park did not ensure the conditions for completing the entire industrial park infrastructure system, especially the system of environmental protection works according to regulations.

- There were 05 enterprises (Viet Trung Minerals and Metallurgy Co., Ltd; Duc Giang Chemical One Member Co., Ltd; DAP 2 - Vinachem JSC., Vietnam Yellow Phosphorus Co., Ltd; Lao Cai Minerals and Metallurgical Materials JSC.,) that had not yet connected the wastewater treatment system to the centralized wastewater treatment system of Tang Loong Industrial Park. The DONRE reported that the industrial park was building a phase 2 wastewater treatment system, there was no connection system between the enterprise's wastewater treatment system and the centralized wastewater treatment system of the industrial park. (Wastewater treatment system No. 2 was expected to be put into trial operation in the second quarter of 2021 and handed over the work to be put into use in the second quarter of 2021).
- The operation of the solid waste treatment system of the DAP 2 plant caused the GYPS dam failure.

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- The construction and handover of the collection system and wastewater treatment station No. 2 were slower than required, according to the provisions of the environmental protection project of Tang Loong Industrial Park, which should be handed over before June 30, 2020, however, by the time of the audit, wastewater treatment station No. 2 had not been completed according to regulations.

- Dong Pho Moi Industrial Park had a wastewater treatment station when constructing and operating environmental protection technical infrastructure, however, by the time of the audit, it had not yet operated (Plan started in October 2012 and completed construction in May 2013). The reason was that there were a number of projects that had applied to change investment goals, and, the activities of these projects were mainly warehouses, pharmaceutical production, and gas extraction.
- The planning of Tang Loong Industrial Park still had the problem that there were still households living in the area.

Audit content 2

Assessment of management and environmental protection at production, business, and service establishments in the period 2017-2020

- Discharged to the environment parameters exceeds regulations, for example, Lao Cai Apromaco Superphosphate Company Limited discharged some parameters that exceeded 100% of the standards prescribed for receiving wastewater from construction investors and industrial park infrastructure business, this violation was administratively fined 76 million VND by the authorities; Phuc Lam Chemical Joint Stock Company did not thoroughly treat the tail gas of the sulfuric acid production workshop, which affected the surrounding environment, causing trees to burn and peel leaves, this violation was administratively fined 80 million VND by the authorities.

- Not strictly implemented inspection and examination conclusions, for instance, DAP 2 Company did not properly and fully comply with the contents and requirements in the agency's inspection and examination conclusions on environmental protection by competent state agencies to cause to break off the Gyps dam, for this action, the unit was administratively fined 560 million VND. Apromaco Lao Cai Superphosphate One Member Co., Ltd. did not fully comply with the requirements of the inspection conclusion (not yet completed the legal procedures on the environment for drying and grinding items as required), and, the unit was administratively fined 100 million VND by the authorities.

- Not strictly implemented regulations on environmental protection, specifically: At the construction project of waste lake No. 2, Tang Loong apatite ore processing plant, Bao Thang district, Lao Cai province, has been operating since February 2018 without Certificate of Completion of Environmental Protection Works, leading to violations of the regulations on environmental protection, until July 2019, the unit was granted a Certificate of Completion of the Environmental Protection Project, even though it had been in operation for more than 1 year. DAP2 Joint Stock Company has been in operation since 2015 and was recognized with a Certificate of Completion of Environmental Protection Works, however, there was still the category of domestic wastewater treatment station and rainwater collection road which has been operating since 2015 without a certificate of completion of environmental protection works, violating regulations on environmental protection (until 2018 the unit was accepted a

certification, even though there were facilities that had been in operation for 3 years). These were the actions that could be sanctioned based on Point n, Clause 1,2, Article 9, Decree No. 155/2016/ND-CP, but by the time of the audit, the authorities have not clarified the subjective and objective reasons for the delay in granting the certification to have a basis for administrative sanctioning of the above companies according to regulations.

In addition, the inspection and comparison of 06 enterprises operating in Tang Loong Industrial Park (Duc Giang Chemical One Member Co., Ltd; Viet Trung Minerals and Metallurgy Co., Ltd; DAP 2 Vinachem JSC.; Nam Tien Lao Cai JSC.; Apatit Vietnam Co., Ltd; Lao Cai copper refining branch - Vimico), pointed out that the units still had some shortcomings, specifically as follows:

Table 6. Summary of shortcomings/limitations in environmental protection at audited/compared units

No	**Unit name**	**Number of decisions approving EIA/Detailed Environmental Protection Scheme/ Number of discharge permits**	**Comparative assessment results**
(1)	*(2)*	*(4)*	*(5)*
I	**Lao Cai Province**		
	Tang Loong Industrial Park		
1	Apatit Vietnam Co., Ltd	Decision No. 355/QD-MTg dated March 29, 1997, factory capacity of 400,000 tons/year Decision 166/QD-UBND dated January 20, 2009, of Lao Cai Provincial People's Committee;	- The field sampling sheet did not have sampling coordinates (in the report on environmental quality monitoring results in the first quarter of 2018)
			- At the construction project of the waste lake No. 2, Tang Loong apatite ore extraction plant has been operating since February 2018 without a certificate of completion of environmental protection works, violating regulations on environmental protection, until July 2019, the unit was granted a certification, although it had been in operation for more than 1 year.

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2	DAP 2 Vinachem., JSC	Decision No. 1579/QD-BTNMT dated August 26, 2010, of the Ministry of Natural Resources and Environment	- The GYPS waste dump in some locations exceeded the design capacity (+30m) of +15m - The operation time of Gyps waste dumping had not met the regulations (Section 1. II, objective of Decision No. 452/QD-TTg dated April 12, 2017, temporary waste dumps can only be stored for a limited period of 2 years of production)
			- The 220 kV line (Yen Bai - Lao Cai) and the 110 kV line (of Su Pan 2 Hydropower Joint Stock Company) have been in operation since 2006, during the operation, DAP 2 company dumped waste in the power line. Visually, the Gyps dump had a higher elevation than the power line, the slope had a slope that threatened to cause unsafety, below the power line area had been dumped Gyps (safe distance could not be assessed by eyes) and at the same time, the company had a safety warning sign in accordance with regulations.
3	Lao Cai copper refining branch Vimico	Decision No. 2154/QD-BKHCNMT dated October 10, 2001, of the Ministry of Science, Technology, and Environment	- Minutes of on-site monitoring sampling (in the dossier of the fourth quarter of 2018) lacked the signature of the representative of the production and business establishment
4	Duc Giang Lao Cai Chemical One Member Co., Ltd	- Decision No. 522/QD-BTNMT dated March 20, 2009, of MONRE	- Failure to handle and repair faulty or damaged automatic monitoring equipment at the request of the Department of Natural Resources and Environment, which had to be completed before July 31, 2020, but so far the unit has not completed the repair. (at the WPA workshop)
			- Duc Giang Chemical Plant, Food Acid and Phosphate Salts Factory went into operation without a Certificate of Completion of Environmental Protection Works, violating regulations on

			environmental protection (until 2018 the unit was granted a certification). (The People's Committee of Lao Cai province had issued an administrative sanction decision according to regulations)
5	Viet Trung Minerals and Metallurgy Co., Ltd	Decision No. 740/QD-BTNMT dated April 21, 2010, of MONRE	- There was no automatic and continuous emission monitoring device for SO2 parameter as prescribed in Document No. 680/STNMT-CCBVMT dated April 19, 2016, of DONRE on the installation of automatic and continuous monitoring equipment for emissions and wastewater
			- The company has been operating since 2015 without a Certificate of Completion of Environmental Protection Works, violating regulations on environmental protection (until 2018 the unit was accepted a certification although there were facilities that had been in operation for 3 years) (Lao Cai People's Committee had issued a decision on administrative sanctions as prescribed)
			The field sampling sheet did not have sampling coordinates (in the report on environmental quality monitoring results in the first and second quarters of 2020).

Source: State Audit of Vietnam, 2021

General conclusion of the audit

These achievements

Firstly, the issuance of documents to urge and guide establishments to implement rules on environmental protection, propaganda, and implementation of texts, regulations, and plans on environmental protection are carried out in IZs and EZs quite completely.

Secondly, the appraisal and approval of environmental documents ensure that the order and procedures are in accordance with the State's regulations.

Thirdly, the inspection, examination, and guidance have discovered that many establishments have not strictly complied with regulations on environmental protection, etc.

Fourthly, the Lao Cai People's Committee in collaboration with the Department of Natural Resources and Environment has supported IZs and EZs to invest in upgrading infrastructure

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for environmental protection in industrial zones, clusters, and urban centers of grade IV or higher. Result:
- 100% of IZs have invested in centralized wastewater treatment systems;
- Investment and installation of 01 automatic emission monitoring station;
- The project is underway to build a concentrated solid waste treatment area in Tang Loong Industrial Park;
- 100% of new investment projects must apply waste treatment technology up to environmental standards;
- Production and business establishments in the province have focused on investing in technological innovation towards environmentally friendly clean production;
- 100% of mining projects must make a deposit, and after the mining is finished, the environment must be renovated and restored according to regulations;
- Basically, the arising environmental problems are handled and promptly resolved by all levels of the industry.

Existing limitations and reasons

Firstly, regarding the work of promulgating documents
- Regulation on coordination in environmental management and protection in Lao Cai province, No. 3459/2017/QD-UBND dated August 2, 2017, of the Provincial People's Committee after more than 3 years of implementation from 2017 to now, has revealed several problems that are not consistent with current regulatory documents, and still inadequate and limited compared to reality.
- The Provincial People's Committee was late in issuing the plan to respond to environmental incidents. However, until 2020, the Lao Cai People's Committee has organized a master plan to prevent and respond to environmental incidents in Tang Loong Industrial Park.

Secondly, regarding the appraisal and approval of environmental documents

The appraisal, licensing, and approval of environmental documents by the Department of Natural Resources and Environment and the Economic Zones Authority still have some shortcomings and limitations that have not been discovered and adjusted.

Thirdly, regarding the work of inspection, examination, and settlement of complaints and denunciations

The Economic Zones Authority has not fulfilled its duties and responsibilities to cause an environmental incident at the GYPS dump of DAP2.

Fourthly, regarding monitoring, monitoring, and evaluation of waste management and treatment activities and the current state of the environment.

The functional units have had many solutions to overcome the environmental pollution, however, so far the environmental pollution in Tang Loong Industrial Park has not been completely overcome, causing prolonged frustration for the households living in IZs; there is an inadequacy in GYPS dump of DAP2.

Fifthly, about the construction and operation of environmental protection technical infrastructure works of the EZ

The adjustment and expansion of the general construction planning of Tang Loong Industrial Park have not yet ensured the conditions for the completion of the entire infrastructure system of the EZ, especially the system of environmental protection works according to regulations.

Sixthly, in terms of management and environmental protection at production, business, and service establishments in the period 2017-2020, there were still many shortcomings and typical shortcomings as follows:

- It did not implement strict regulations on environmental protection. Some businesses and establishments operated all or part of a project without a Certificate of Completion of Environmental Protection Works. The main responsibility belonged to the project owner who did not harshly comply with regulations on environmental protection;
- The parameters of discharge into the environment exceeded the regulations, in the course of operation, some factories still had problems, leakage of exhaust gas in order to cause resonance effects affecting the trees and crops of people living around the area such as DAP2 Factory, DCP, etc.
- The management and environmental protection of production and business establishments still had many shortcomings and inadequacies, thereby reducing the effectiveness, efficiency, and compliance in performing the responsibilities and duties of state management agencies in charge of the environment and the implementation of regulations on environmental protection by production, business and service establishments in IZs and EZs of Lao Cai province. This led to widespread violations of regulations on environmental protection, lasting for many years, increasing the risk of environmental pollution.

One of the main reasons leading to the shortcomings in environmental management in IZs and EZs in Lao Cai province was limited province funding, so the investment in infrastructure for environmental protection was synchronized, for example, it invested in concentrated solid waste and wastewater treatment zones in industrial zones and clusters, especially Tang Loong Industrial Park.

In addition, the awareness of businesses in complying with legal regulations on environmental protection was not high, leading to some incidents that affected people's lives and cause a loss of security and order such as leakage of non-ferrous metallurgy plant, Ban Lau commune, Muong Khuong district and the breakdown of sewage return pipeline at the Gysp dump of DAP2 factory, etc.

SOME RECOMMENDATIONS

Recommendations of the State Audit

Firstly, for the Department of Natural Resources and Environment of Lao Cai province

- Coordinate with the Economic Zone Authority to advise the Provincial People's Committee to remove problems with State regulations related to Gyps temporary dumping site of DAP 2 Joint Stock Company to ensure environmental safety.
- Review violations of Vietnam Apatite One Member Company Limited (construction project of waste lake No. 2, Tang Loong apatite ore processing plant, Bao Thang district, Lao Cai province, which has been operating since February 2018 without Certificate of Completion of Environmental Protection works) and DAP 2 Joint Stock Company (the domestic wastewater treatment station and rainwater collection road has been operating since 2015 without Certificate of completion of the environmental protection works) have subject to fines according to the provisions of Decree No. 155/2016/ND-CP. If they are subject to fines, the DONRE shall report to the Provincial People's Committee to sanction according to regulations.

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- Review and make statistics on the number of establishments subject to periodic hazardous waste management reports and those that fail to comply with the reporting regime to take strict measures by regulations of law.
- Combine with Economic Zone Authority to urge businesses that have not yet installed continuous automatic monitoring systems to urgently install and complete them before December 31, 2021, in accordance with regulations.
- Coordinate with Economic Zone Authority to urge businesses (Vietnam Yellow Phosphorus Co., Ltd., Apromaco Lao Cai Superphosphate Co., Ltd., Lao Cai Southeast Asia Co., Ltd., Duc Giang Chemical One Member Co., Ltd.) repair and fix broken automatic monitoring system equipment. Moreover, Viet Trung Minerals and Metallurgy Co., Ltd must add SO2 gas parameters to the automatic monitoring system in accordance with regulations.

Secondly, for the Economic Zone Authority and Industrial Zones of Lao Cai Province

- Rectify and strengthen regular and comprehensive inspection and supervision of enterprises in industrial zones under management in the implementation of the contents of inspection and examination conclusions, instructions of the competent authorities, and the reports of environmental protection. It is necessary to review and learn lessons for not performing all functions and tasks to cause the Gyps dam failure of DAP 2 Company, and to take drastic measures to prevent similar environmental incidents from happening.
- Strengthen special supervision for the Gyps dumping site of DAP2 Company operating in accordance with regulations and taking safety measures for the Gyps dumping site (especially when the rainy season is coming) to avoid this dam failure as happened in 2018.
- Research and build a scientific and effective database software system for monitoring, supervising, and urging facilities to make periodical monitoring reports to ensure compliance with regulations.
- Advise the Provincial People's Committee to have a plan to deal with the relocation of households living close to the Tang Loong industrial park under the set schedule. It coordinates with the Department of Natural Resources and Environment to take timely measures to settle petitions and complaints of people and take drastic measures to solve the problem of environmental pollution in the Tang Loong industrial park.
- Coordinate with 220 KV and 110 KV power line management companies in the Gyps dump area of DAP 2 company to assess the safe distance according to current regulations and take measures to ensure safety for the Gyps yard adjacent to high-voltage power lines with a steep slope to avoid landslides that affect the safety of the national power grid.
- Review, make statistics and make a list of establishments that do not strictly and fully implement the environmental monitoring program and violate regulations on environmental protection through inspection results and guidance in the period 2017-2020 and, report to competent authorities for establishments committing acts of violating environmental protection for timely handling according to regulations.

Thirdly, for the People's Committee of Lao Cai province

- Direct the Department of Natural Resources and Environment, the Economic Zone Authority, and relevant units to strictly implement the recommendations of the State Audit of Region VII, in which special attention should be paid to directing the Economic Zone Authority to strengthen supervision of the Gyps dumping site of DAP 2 Company to operate in accordance with regulations and have safety measures for Gyps dumping site (especially when the rainy season is coming) to avoid the dam breaking of this dumping site as happened in 2018.

- Direct the Economic Zone Authority and related units to review and draw lessons from collectives and individuals related to shortcomings in environmental protection management as stated in the audit results, specifically some shortcomings, for instance, industrial zones have not yet assessed their environmental impacts, delay in approving the Environmental Protection Scheme as well as delay in formulating plans to prevent and respond to environmental incidents, fail to fulfill responsibilities, leading to the breakdown of Gyps dump spilling into the environment
- Direct functional units to correct and draw experience in advising and promulgating Decision No.3459/QD-UBND dated August 2, 2017, of Lao Cai Provincial People's Committee promulgating regulations on coordination in environmental management and protection in Lao Cai province on the assignment of planning to respond to environmental incidents in industrial zones and clusters of the Provincial People's Committee without clear regulations.
- Direct the People's Committee (Lao Cai city, Muong Khuong district, Bat Xat district, Bao Thang district) to stop authorizing the appraisal and certification of the Environmental Protection Plan to be in line with current regulations.
- Carry on organizing the relocation of households living close to the Tang Loong industrial zone according to the set schedule. It needs to take timely measures to settle petitions and complaints of people in Tang Loong industrial park and direct functional units to deal with the environmental pollution in Tang Loong industrial park.
- Continue to inspect and review the status of management and operation of the Gyps dump of DAP 2 Company to handle violations (if any), and at the same time coordinate with the enterprises to report face difficulties and obstacles to the Ministry of Natural Resources and Environment, Ministry of Industry and Trade; The Ministry of Construction and the Prime Minister in the implementation of the provisions of Decision No. 452/QD-TTg dated April 12, 2017, of the Prime Minister.
- Direct the Economic Zone Authority, and the Department of Natural Resources and Environment to coordinate with relevant units to organize the assessment, sum up, and review the shortcomings in the process of implementing the regulation on coordination of environmental protection in IZs and EZs in the province in Decision No. 3459/QD-UBND to amend and adjust following current practice and legal documents.

Fourthly, for the Ministry of Natural Resources and Environment

It is important to learn from collective and individual experiences related to the approval of the environmental protection project of Tang Loong Industrial Park 6 months behind regulations.

Some recommendations of the research team

Some solutions for Lao Cai province

- Firstly, continue to focus on leading and directing thoroughly, concretizing and drastically implementing the guidelines and policies of the Party and State on environmental protection.
- Secondly, carry out propaganda and education work to raise awareness and responsibility for environmental protection work at all levels of the Party committees, authorities, socio-political organizations, management boards of the EZs, IZs, production and business establishments, and all classes of people.
- Thirdly, resolutely eliminate projects with outdated technology, limit investment in projects with high potential for environmental pollution that investors do not clarify, and provide specific solutions on environmental remediation.

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- Fourthly, assess the technological level of manufacturing plants in industrial zones and ask enterprises to develop a roadmap to replace outdated technologies.
- Fifthly, strengthen the inspection and examination of the observance of legal provisions on environmental protection in production facilities and strictly handle violations of the law.
- Sixthly, economic zones and commercial zones must invest in building environmental protection and technical infrastructure works.
- Seventhly, the Provincial People's Committee can come up with policies to attract domestic and foreign investment in the field of environmental protection, waste and wastewater treatment in the province in general, and IZs and EZs in particular.

Some solutions to improve the audit of environmental management in industrial parks across the country

- It is important to complete the development of the environmental audit process, guidelines, and system of documents and forms on an environmental audit from the legal perspective as well as auditing standards (order, procedures, and methods of performing environmental audit). In particular, focusing on building a system of criteria, a detailed audit program, and an audit method suitable to the audit content and objectives is the key content, ensuring the success of an audit.
- It is necessary to ensure sufficient content, practicality, and feasibility when developing the audit outline about the implementation of environmental audit activities, the assurance audit outline is a “hand-held” document for auditors who do not have practical experience with this audit content. At the same time, develop an audit plan to ensure that the audit material is correctly identified, thereby determining the appropriate contents and criteria, meeting social needs, and being realistic and feasible to make valid recommendations on mechanisms and policies in environmental protection in all fields.
- Regarding human resources for environmental audit, it is necessary to arrange a sufficient number of auditors with appropriate skills and capacities. Before performing the audit, it needs to organize seminars, and training, share experiences, ensure that the auditors participating in the audit have enough basic knowledge about the audit content as well as the technology used in the environmental protection work, or hire consultants (if necessary) for audits of high technical expertise, etc.
- In addition, the State Audit also needs to improve the organizational structure in terms of personnel both size and quality, because currently, there is only one Department of Environmental Audit under specialized State Audit III. Besides, it is also necessary to strengthen exchanges and expand international cooperation on environmental economics.

CONCLUSION

Over the past time, environmental audit in Vietnam has played a very important role and is an effective tool to help the State assess environmental management, and evaluate the economy, validity, and effectiveness of strategies, policies, and legal system. However, environmental audits performed by the State Audit are still mainly integrated into financial statement audits, and compliance audits and few environmental audits are operational or are performed independently, so the audit results are not as expected.

The research team wants to provide complete, scientific, and comprehensive information about an audit in a specific locality with in-depth research, analysis, and evaluation of environmental management in industrial zones in Lao Cai province in order to help readers have an overview of this activity of the State Audit of Vietnam. In addition to the recommendations of the State

Audit for environmental management agencies in Lao Cai province, the research team also has several proposals and recommendations from the perspective of researchers for Lao Cai province and some proposed solutions to promote the validity and efficiency of environmental audit activities in general and audit activities of environmental management in particular throughout the country in the coming time.

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