

Waste Auditing in Beer Manufacturing Companies – Evidence from Vietnam

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The objective of the study is to assess the application of waste auditing in the 33 largest Vietnamese beer manufacturing companies. Quantitative method through surveys and qualitative method by deep interviews were conducted in 2019 for the 33 leaders to collect and process data. The research results showed that 100% of enterprises recognise the importance of building an environmental management system (EMS) on environmental protection and sustainable development. Although waste auditing is crucial for production and business activities, enterprises have not been ready to conduct it. Carrying out activities related to the environment is mainly to meet the legal requirements or other mandatory requirements from environmental management agencies. The main reasons are that waste audit guidelines, standards, and criteria are inadequate, and auditing force is still limited in terms of professional skills and experience. Therefore, the study proposed some recommendations to promote applying waste auditing in an effort to achieve sustainable development goals.

Key words: *Waste Auditing, Environmental Management, Beer Company, Vietnam.*

Introduction

Economic development, continuous population growth and environmental pollution are extremely hot topics in Vietnam. According to the statistics of the Department of Economic Zone Management, Vietnamese industrial zones currently generate 8,000 tons of solid wastes every day, equivalent to nearly 3 million tons each year. Forecast results show that total solid wastes from industrial zones will continuously increase from 9.0 to 13.5 million tons in 2020. Therefore, the risk of environmental pollution and the impacts on public health are very alarming. This raises the requirements for strong and effective application of waste

management and disposal tools in environmental protection.

Among environmental management tools, waste auditing is a useful tool to control environmental pollution and has been applied in many countries. A simple understanding of waste auditing is to examine the causes of wastes, determine solutions to limit the source of emissions, increase reuse, or eliminate wastes completely. As a result, this will help production process more efficiently and better protect the environment.

In addition to great economic contributions, the production activities of beer companies have created a large amount of waste to the surrounding environment. A number of beer enterprises are on the list of establishments causing serious environmental pollution. Considering that waste auditing is an environmental management tool to address the deteriorating situation of industrial wastes in Vietnam in general and beer companies in particular, the authors conducted research on waste auditing. This study is aimed at assessing the application of waste auditing at the 33 largest Vietnamese beer companies.

This article is divided into the following sections. After section 1 (the introduction), section 2 deals with the grounded theories of waste auditing. Section 3 presents the research methodology. Section 4 explores the results and analysis through an experimental survey and thorough interview. The end of the article suggests recommendations to motivate beer companies to apply waste auditing.

Research overview

Overview of Waste Auditing Research in the World

Waste auditing appeared in the late 1980s when the rapid development of industry in European and South American countries discharged a large amount of wastes and emissions into the environment that is the main causes of environmental pollution, climate changes and degradation of life quality (INTOSAI, 2004a). Although being instituted quite late compared to other types of auditing, waste auditing has achieved significant improvement in both theory and practice. There are many studies of waste auditing in different aspects and fields (Hunt, 2015; Seejuhn, 2002).

It can be said that the most rapidly developing period of the world economy was from 1960 to 1970, the period of the industrial revolution. At that time, economic development was at the forefront in the trend of "development at any cost" that overwhelmed all other factors of development including society, culture, and environment. After a series of environmental catastrophes, national governments, scientists and experts admitted that economic development has had negative consequences on the environment, society and human quality of life,

especially for future generations.

In particular, the operation of enterprises in the industrial sector is the main source of pollution (Visvanathan, 2007). Many questions are raised such as: what tools are needed to manage and monitor enterprises' compliance with environmental laws and regulations? Which of the agencies, organisations and individuals perform the tools? How can we achieve both industrial development and environmental protection?

All of these issues are addressed in a document named "Friends of the Earth: Environmental Regulations for Local Governments", published in 1989 (McLaren, 1989). This publication indicates that manufacturing enterprises are responsible for environmental damages due to the release of toxic chemicals into the sea and atmosphere. Enterprises must account for environmental issues in their annual reports and come up with solutions to reduce industrial wastes, improve environment activities, and reduce health risks to the community. For the state, it is necessary to promulgate and strictly control the implementation of environmental regulations in order to limit enterprises' economic activities that have negative environment impacts. One of the tools that manage and monitor environmental issues is waste auditing. Thanks to this publication, the interaction between enterprises and the environment began to be deeply transformed. Many large United States' corporations have established a form in the content of the audit program to reduce waste.

Only after the International Standards Organisation (ISO) developed and issued the standards for environmental management system ISO 14000 (ISO, 1996), the significance, the main task and the methodology of environmental auditing are then actually proposed at an international level. The organisation pointed out that waste auditing is an intensive area of environmental audit. It is the environmental management tool used to determine the type and amount of wastes generated during the production process. Waste auditing helps enterprises devise solutions to reduce or eliminate wastes, recycle and reuse wastes to optimise resources and improve production efficiency, as well as prevent pollution. Environmental management systems ISO14000 is standardised by ISO14010 - general principles of environmental auditing, ISO14011 - guidelines for auditing process of environmental management system and ISO14012 - qualification criteria for environmental auditors. An audit of environmental management system (EMS) is a basis for assessing whether an enterprise is certified for an environmental system. However, the standards only focus on the assessment of EMS, therefore there is a lack of guidance on the contents of other environmental audits such as waste, biodiversity, or water auditing.

The appearance of studies by UNIDO (1991) and OWMC (1993) is a milestone for the development of waste auditing in the world. This document shows the need of waste auditing for the industrial sector. In the past, industrial waste management focussed on waste treatment at the end of pipelines, which was not effective. Waste auditing is the first step in a long-term



program to optimise the full utilisation of resources and improve production efficiency, towards the goal of sustainable development. In other words, waste auditing allows a comprehensive and objective view of production processes and waste in order to reduce the source of waste, increase reuse or eliminate waste completely. This document has designed a complete waste audit process, which can be widely applied in industries and for many users such as: businesses interested in improving their processes; consultants making reports to industrial customers; Government organisations that are responsible for checking the operation of enterprises causing pollution.

Many studies develop waste audit processes and procedures issued by Davidson et al. (2011) and INTOSAI (2014a, 2014b). This study particularly emphasises the current situation of increasing industrial waste that obliges the public and governments to strictly manage, effectively recycle, and reuse waste as well as promoting multilateral agreements and international cooperation in environmental protection. A waste audit process consisting of 4 stages: identifying issues of environmental risks and human health; reviewing the waste management system; studying and calculating material balance; and evaluating audit results. This document was created to show the supreme audit agency's interest in environmental issues. In particular, the increase in environmental legislation has forced the supreme audit agencies to make necessary adjustments to the scope and content of the audit. From auditing simple issues, they have shifted to auditing more complex environmental issues.

There have been a number of research projects relating to waste auditing in specific industries (Hunt, 2015; ICFT, 1989; Seejuhn, 2012). An organisation that has proper management of environmental issues will gain economic benefits as well as improve its competitive advantage in the market. In today's world, evidence of corporate environmental responsibility is becoming an important criterion for contractors to select suppliers. Environmentally-conscious customers will also prioritise partners who share the same viewpoint. Therefore, the certification of environmental management systems will help businesses improve their reputation and enhance their image value with customers, strengthening relationships with relevant agencies and the community. To do so, businesses must register for a registration audit (to check the appropriateness of EMS with ISO standards) and supervision audits (to check the level of EMS retention) of an environmental management system with the ISO certification authority. This document provides guidance for businesses to conduct an audit of environmental management systems including an assessment of whether waste management activities meet ISO 14000 standards (elements of a successful solid waste audit program) and best practice management standards (waste reduction, recycling, reuse, disposal), propose methods to reduce waste and recycle, reuse waste most effectively. The final part of the document provides a framework for identifying waste generation and costing, current waste reduction activities, more reduction goals and optional implementation.

Although existing for 30 years, waste auditing has achieved strong theoretical and practical development. The researches on waste auditing focussed on developing the system of waste auditing, disseminating knowledge, experience and practical guidance on waste auditing (ECDWM, 2018; EUROSAI, 2011; MEPIE, 2008).

Overview of Waste Auditing Research in Vietnam

Environmental auditing in general and waste auditing in particular are a new issue in Vietnam. In recent years, waste auditing has gained much attention and some studies on it have been appeared that exhibit certain success. Through the process of understanding about waste auditing in Vietnam, the authors draw the following conclusions:

Firstly, the framework of waste auditing in Vietnam is built on the basis of international environmental auditing which is shown in the concept of waste auditing, the need for waste auditing, guidance on waste audit methods and processes in a number of Vietnamese industries. The studies of Trinh & Nguyen (2003) is one of the first documents setting foundations for the appearance of waste auditing in Vietnam. It demonstrates that waste auditing is an effective tool for environmental management, ensuring compliance with environmental laws, and devising options to reduce wastes, increase reuse or eliminate wastes completely.

Secondly, research on practical application of waste auditing is still limited to mainly focussing on high polluted industries. For example, some case studies are conducted in trade villages, leather and footwear industries, chemicals and food processing (Dang, 2004; ISPNRE, 2011; Tran, 2008).

In summary, waste auditing is a new field in Vietnam. Most of the research results are usually from the perspective of environmental managers but not from auditors. In Vietnam, there has not been any research project specialised in the audit sector to undertake the complete and systematic application of waste audit for a specific type of enterprise.

Research Methodology

The study is conducted to assess the implications of waste auditing in the brewing industry. Data was collected through a survey of 33 leaders of the 33 largest beer companies. The leaders surveyed are those who have the most knowledge about waste management, and experience in designing and operating environmental management systems. The questionnaire is divided into two parts, including:

Part 1: Information about the environmental management system. These questions are intended to assess whether the environmental management program is appropriately designed

and implemented such as: are the organisation's environmental policies maintained, updated and changed in accordance with current activities and conditions? How much money they spend for the construction of waste treatment systems? Is the budget of waste auditing allocated properly?

Part 2: Environmental awareness and waste audit. The questions focussed on evaluating managers' perceptions, attitudes and concerns about environmental issues and waste auditing. The questions include: has the company conducted waste auditing yet? If so, how is it implemented? If not, why not? Do managers realise that waste auditing is necessary for their enterprises? How is the role of managers expressed?

For the interviews, we conducted a direct exchange with five leaders. Each interview lasted about 1 hour. The content of the interview revolves around understanding their perceptions about environmental issues, their understanding of waste, sources of waste generation and the impact of waste on health and the environment, the role and responsibility of each individual in production activities and environmental protection. The results of the interviews will be recorded in a manual and serve as a basis to analyse and assess the status of waste auditing. The data is collected and processed through the use of descriptive statistics and comparative methods to highlight the environmental situation and the application of waste auditing in Vietnamese beer companies.

Research Results

Profile of Sample

Figure 1 shows general information for the respondents. Among the 33 respondents, the number of males (87.88%) was much higher than the number of females (12.12%), which agrees with the professional characteristics of waste management in Vietnam. For the education level, post-graduate degrees had the highest rate with 51.5%, followed by university (45.5%) and college (3%). The leaders had a high level of education, ensuring the reliability and quality of survey responses. For years of experience, the number of respondents who have acted as environmental managers from 11 to 15 years was the highest (30.3%), followed by 16 to 20 years (27.3%), from 6 to 10 years (21.2%), more than 20 years (12.1%), and 1 to less than 5 years (9.1%). Ultimately, the respondents with extensive experience in the field of environmental management clearly understood about EMS and waste auditing.

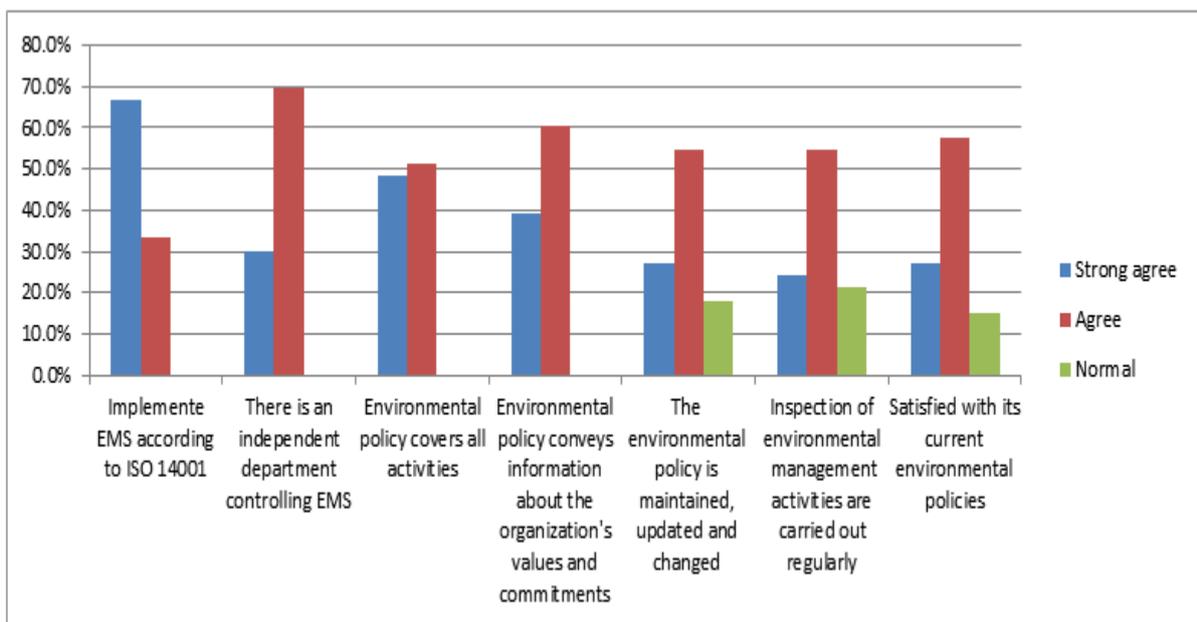
Figure 1. The characteristics of respondents



About Environmental Management System

According to the survey results in figure 2, 100% of enterprises recognise the importance of building an environmental management system (EMS). Therefore, all enterprises have established EMS such as ISO 9000 and/or ISO 14001 in business activities. In addition, most enterprises issue environmental policy which covers all activities of the organisation impacting the environment. This policy which conveys information about the value and commitment of the organisation related to environmental activities are maintained, updated and changed in accordance with the current conditions. The inspection and supervision of environmental management activities are carried out regularly. As a result, managers satisfy with their environmental policy.

Figure 2. Percentage share of answers about environmental management system

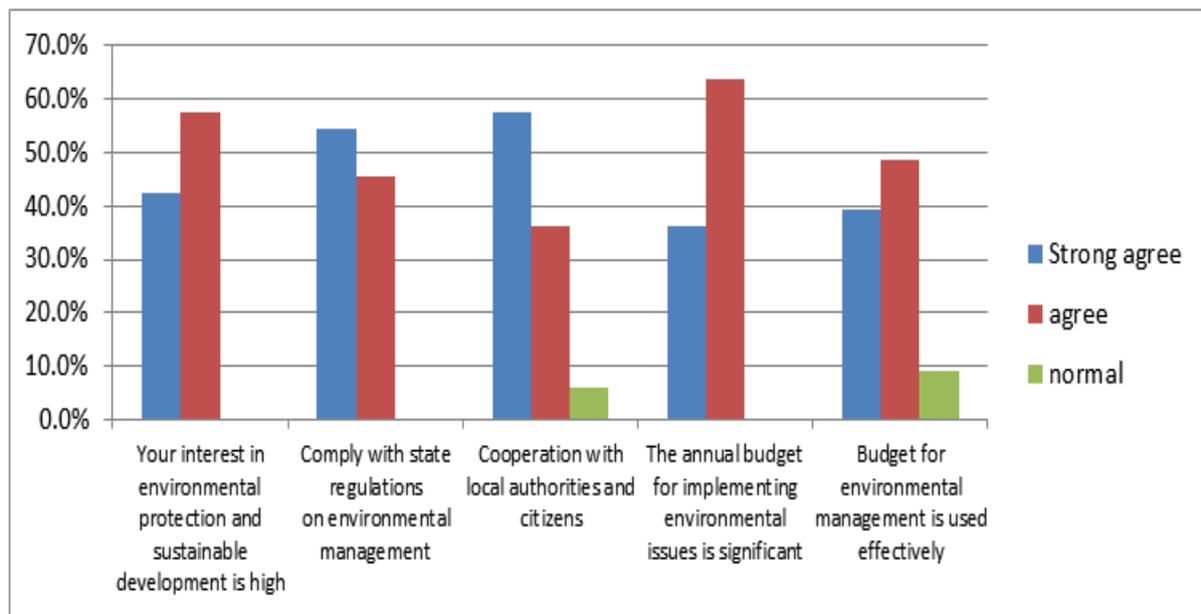


After deploying an EMS according to ISO 14001, companies realise the essential value and meaning of EMS. In addition to the benefits of environmental protection and the compliance with environmental laws, companies significantly reduce production costs and enhance their images in the market.

Assessment of the Current State of the Environment and Waste Management

With the characteristics, technology, and production scale, the brewery industry produces a large amount of waste every year. Environmental issues are concerned in the industry including: large wastewater flow and significant pollutant load; a lot of water and energy for production; odour problems from fermentation houses and gas emissions from boilers; the enormous amount of solid waste.

Figure 3. Percentage share of answers about assessment of the current state of the environment and waste management

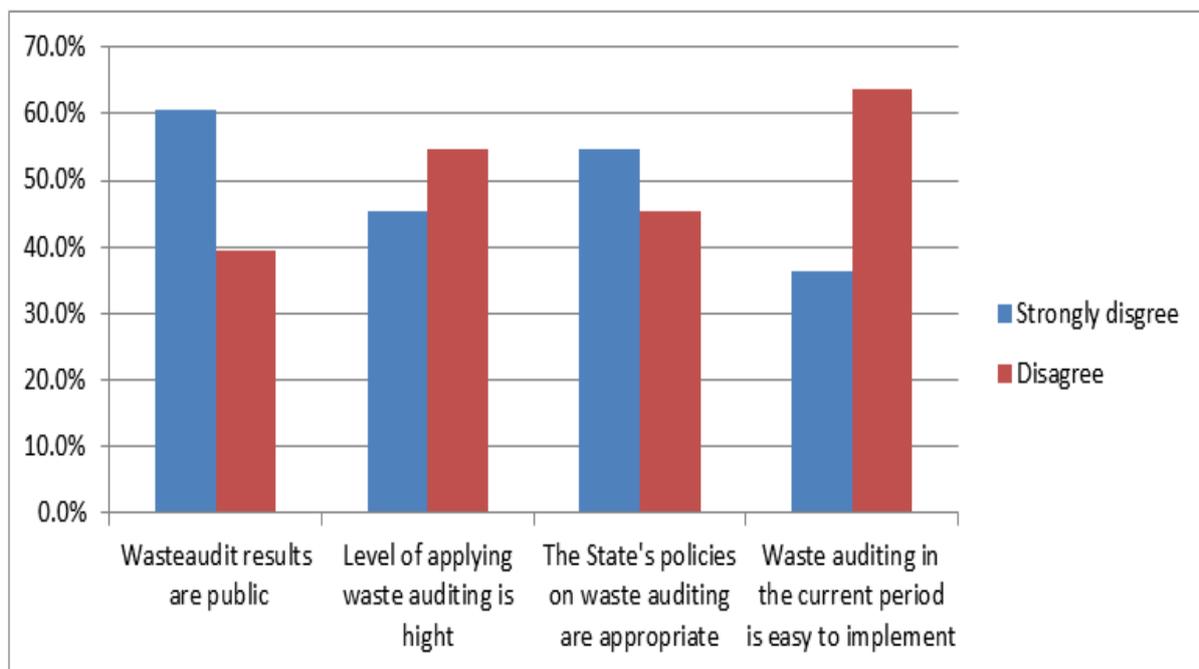


Surveying the board of directors is conducted to assess the current state of the environment and waste management. Figure 3 indicates that all companies share their concerns on environmental protection and sustainable development. Most companies comply with the regulations on environmental protection and spend a certain amount of money to implement measures to improve the environment, as well as being ready to cooperate with the local authorities and community.

Situation of Waste Auditing

In figure 4, most of the leaders answered that their company conducted waste auditing at low level. Understanding and awareness of managers about waste auditing are still limited. It is explained that the system of legal documents related to environmental auditing in general and waste auditing in particular has not been issued and instructed fully, and consistently. There is no provision on the rights to conduct waste auditing such as: what kind of businesses required to conduct waste audits, which of the organisations are auditing wastes.

Figure 4. Percentage share of answers about the situation of waste auditing



Although waste auditing is crucial for production and business activities, especially in the beer industry, enterprises have not been ready to conduct it. Carrying out activities related to the environment is mainly to meet the legal requirements or other mandatory requirements from environmental management agencies.

However, many people believe that waste auditing should be done by state audit rather than an independent or internal audit. The results of waste auditing should be presented in environmental reports. At the same time, they also think that the cost of a waste audit is quite high (from VND 100 to 300 million) depending on the scope and nature of an audit. They also highly appreciate the important role of waste auditing in the current period (54.55% important, 45.45% very important). However, the lack of knowledge and experience on waste auditing from auditors will make difficultly to apply (accounting ...).

With the question surrounding whether it should be compulsory to conduct waste auditing on business activities, 25 respondents answered Yes (accounting for 75.76%) and the remaining answered No (24.24%). With the view of Yes, all businesses believe that production and business activities often generate a huge source of waste into the environment. Therefore, the problem of waste treatment in their businesses is one of the important stages that they are always concerned with, and they are always looking for ways to minimise waste to the environment, but at a low budget. They believe that waste auditing will help them do this. The enterprises also show that waste auditing should be mandatory, but it depends on the type of businesses. With the answers of No, this point indicated that companies only need to comply with the legal requirements, waste auditing is not necessary if it does not bring much economic benefit to the enterprises.

In addition, when interviewing five leaders of the beer companies, the study found that their awareness and understanding of waste auditing is limited. In the current trend, environmental management activities are an important issue. However, managers do not fully understand waste auditing as providing guidance on environmental performance. Carrying out environmental activities is mainly to meet the legal requirements from environmental management agencies.

Environmental issues are barely included in the business plans, as well as in the enterprise's accounting system. The fact shows that the financial regulations, standards, accounting regimes have not provided the necessary information on environmental costs. The environmental information generated is not presented in specific accounts but is reflected in the overall accounts such as management costs, such that managers cannot detect the size and nature of each environmental cost. In addition, the accountants have not recorded the environmental costs such as costs of repair, compensation and costs of cleaning in accidents.

The state audit, ministry of finance, and auditing professional association have not collaborated with environmental organisations to develop a separate process and method for waste auditing. Due to the specific nature of the environmental factors, waste auditing requires a very broad knowledge of other science subjects such as engineering, geography, chemistry, and environmental management. Some techniques of these subjects should also be used, such as field surveys, descriptive lists, impact assessment matrix and cost benefit analysis. However, the waste auditing conducted by state audits is mainly based on traditional methods and techniques. This will be limited to auditors in giving their opinions on the environmental issues that will affect the quality and effectiveness of the audit report.

Waste audit guidelines, standards, and criteria are inadequate. Due to the diversity of activities in the auditing subjects such as many environmental factors, the wide-ranging impacts and differences in the evaluation criteria between regions, we have not established guidelines,

standards and evaluation criteria in waste auditing. Consequently, it is difficult for auditors to identify the causes and impacts of environmental factors, both qualitatively and quantitatively.

Auditing force is still limited in terms of professional skills and experience in some environmental intensive fields. Auditors have only participated in some training courses and seminars on environmental auditing organised by INTOSAI. They have not been guided by many experienced experts in environmental auditing for specific instructions on how to conduct an environmental audit.

Conclusion

In order to motivate beer enterprises to apply waste auditing, the involvement of state agencies and enterprises themselves is required. Specifically:

In the Case of State Agencies

**** Establishment of the Legal Environment for Waste Auditing***

In recent years, recognising the importance of waste auditing for environmental protection and sustainable development, state auditing has turned waste auditing into one of indispensable contents in its activities. In general, the waste auditing conducted by state auditing are mostly experimental or integrated in financial and compliance audits, but not really specialised into the field of environment. Therefore, the contents and objectives of these audits are just limited to check and assess the fairness of financial statements, compliance with laws and environmental policies. In addition to that, state audit has not drawn conclusions and recommendations on the effectiveness and efficiency of the environmental management, and the available environmental funds in accordance with the principles of environmental protection. In order to improve the legal status of the state audit for waste auditing, the state agencies need to:

- Fully promulgate legal documents on environmental auditing in general and waste auditing in particular, which emphasise the role and rights of auditors, audit firms and professional associations.
- Establish policies to encourage and support the enterprises to apply waste auditing in their business activities. At the same time, it is necessary to build sanctions to force the enterprises to repair and remedy environmental damage.
- Develop information systems and databases on waste auditing. The digital data system must be established on all aspects as a basis for researching and serving waste auditing easily.

**** Training and Fostering the Audit Profession in the Field of Waste Auditing***

- Develop and renew training programs closer to the requirements and suitable to each type of auditor; arrange training programs to improve auditing skills.
- Select and make available auditors who have much knowledge and practical experience in the field of waste auditing to improve training quality.
- Strengthen in-depth audits in the direction of coordinating with organisations processing environmental management functions.
- Promote international cooperation, enhance professional exchanges on waste auditing, and send officials to learn from experience on computerisation of auditing activities to advanced countries.
- Apply information technology to audit operations, focus on building and using application software for waste audit activities.

**** Issue a Guideline for Waste Auditing***

- Develop specific standards and guidelines for waste auditing in accordance with international practices, comply with Vietnamese laws and cover the characteristics of waste audits.
- In terms of content, the waste audit process can:
 - Refer to the experience of countries in the region or developed countries such as the Britain and United States about waste audit models applicable to Vietnamese characteristics.
 - Issue criteria sets for each type of audit consisting of compliance, finance and operation in waste auditing; collaborate with government agencies to develop standard models for managing programs and projects.
 - Invest in research and surveys at brewery enterprises that have implemented waste audits, in order to detect advantages as well as barriers, thereby recommending solutions to promote the implementation of waste audits in future.

In the Case of Beer Manufacturing Enterprises

**** Raising Awareness of Environmental Protection***

Environmental protection is the responsibility of the whole society, which requires managers to change the awareness of environmental problems and to change their behaviour in business processes. Specific solutions are suggested, such as:

Firstly, comply with laws and regulations on environmental protection; apply green technologies in the process of implementation to minimise environmental negative impacts and save increasingly limited resources.

Secondly, improve the companies' awareness of the role and function of the internal control system. As a result, the board of directors will create the necessary conditions to ensure

compliance with the environmental policies and regulations; prevent, detect and handle activities and behaviours that do not comply with laws on environmental protection; apply environmental friendly practices and measures.

Thirdly, conduct environmental impact assessments. The enterprises need to seriously carry out impact assessments and environmental protection commitments when they plan to implement project investment.

**** Perfecting the Environmental Management System***

In order to improve environment management, the following issues need to be considered, as follows:

- Deep guidance on building an environmental management system such as ISO 14001 so that all employees in the enterprise can participate in the design and operation of an effective environmental management system.
- Plan human resource training to ensure that national and international regulations and standards of products related to the environment are applied.
- Deep understanding of the operations of enterprises, have professional knowledge about environmental technology and legal documents, as well as environmental standards system.
- Operate systems of processing, analysing and checking the assurance level of environmental standards; assess environmental impacts throughout production processes; timely access to market information related to the environmental factors of products.

**** Develop Internal Audit Department as a Premise for Waste Auditing***

Internal audit can bring many benefits for the companies. This is a tool to identify and improve weaknesses in management systems. The board of directors can control their operations better, manage risks better, and increase their ability to achieve business goals. An enterprise with internal audit will increase the confidence of shareholders and investors in the stock market about management systems. Many studies show that companies possessing internal audit departments often provide timely reports with high levels of transparency and accuracy, and low fraud likelihood. As a result, these companies' performance is higher than companies without internal audit departments.

Currently, most beer companies do not have a clear internal audit department. It means that the functions of evaluating the control activities and the effectiveness in using resources are limited. Relying on external inspection such as state audit, government inspection, and independent audit is not enough to meet requirements. Therefore, managers need to be properly aware of the role of internal audit activities and build an internal audit department appropriately to check and evaluate regularly on the entire operation of the business, including environmental

issues.

**** Researching, Applying and Investing in Technological Innovation towards to Sustainable Development***

The orientation of beer companies should be to develop based on advanced technology, focussing on economic efficiency and in line with the integration trend in order to create high-quality and competitive products based on modern and environmentally friendly technology. Therefore, companies need to make specific technological improvements as follows:

- Arrange waste treatment equipment to improve operational efficiency and minimise environmental pollution. Exchange harmful technologies with clean, technologies; invest in waste treatment technology in two options: encouraging research on equipment design and technological lines that can be domestically produced; and importing advanced technologies from abroad to ensure waste treatment aimed at achieving environmental standards.
- Recovery and reuse of highly polluting solid wastes, limiting the use of polluting fuels in production in order to significantly reduce the sources of pollution.
- Implement clean production processes for products to reduce risks to humans and the environment; apply clean production methods that not only limits domestic pollution, but also reduces production costs and enhances product competitiveness.

**** Strengthen the Application of Information Technology for Timely Analysis and Processing***

In the trend of globalisation, one of the problems that the companies in developing countries face in promoting export and penetrating into the international market is the lack of information. To overcome this situation, first of all the companies need to promptly update domestic environmental laws to capture the provisions of environmental taxes and fees, and regulations on sanctions. At the same time, they must actively explore the provisions of international environmental laws, such as standards and measures on health applied to export products in key markets.

In addition, companies need to equip management software systems and informatics devices for their operations in the internal audit department. This system allows the connection of information and data between the auditor's computers, so that the head of the auditing department can monitor their activities during the audit process, and correct them in a timely manner, and provide necessary instructions. On the other hand, the system also helps auditors in preparing audit reports more quickly and accurately.

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