



AUDIT DIAGNOSIS FROM ISO 14001 VERSION 2015 OF THE MANAGEMENT OF SOLID WASTE AT THE COMPANY FOR THE MANAGEMENT OF OIL STOCKS OF CÔTE D'IVOIRE (GESTOCI) IN ABIDJAN-CÔTE D'IVOIRE

DAKOURI Guissa Desmos Francis*

* Maître-Assistant, Institut de Géographie Tropicale, Université Felix Houphouët-Boigny de Cocody-Abidjan (Côte d'Ivoire)

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ABSTRACT

In a context of social responsibility, production, as well as the exploitation of goods, should be carried out with a view to minimising environmental, economic and social impacts. With this in mind, GESTOCI has embarked on an environmental approach in order to develop an environmental management system. The objective of this study is to highlight non-conformities in solid waste management based on the ISO 14001 version 2015 standard. The backbone of the methodological approach that enabled this study to be carried out is made up of documentary research and diagnostic interviews based on the requirements of the ISO 14001 version 2015 standard. The rate of non-compliance in chapter 4 "Context", chapter 5 "Leadership", chapter 6 "Planning", chapter 7 "Support", chapter 8 "Carrying out operational activities", chapter 9 "Performance assessment" and chapter 10 "Improvement" is 59%, 76%, 81%, 89%, 84%, 93% and 90% respectively. These rates, which are very high, represent what could be described as bad practices in solid waste management at GESTOCI.

INTRODUCTION

The beginning of the third millennium is characterised by ever-increasing competition and the globalisation of markets. This situation is the result of globalisation and technological development. It is no longer enough to do one's job well; it is necessary to provide a quality product and/or service that meets the needs and expectations of the customer (ISO 9000 version 2015, p.2). Surviving in this competitive environment requires the implementation of new management approaches, one of the most important of which is quality management. It therefore appears necessary, even essential for a company or institution wishing to emerge, to make quality its hobbyhorse. As a technical discipline for the optimisation of resources and also for the establishment of a consensual basis for exchange and understanding between suppliers and customers, quality is the instrument that undoubtedly gives rise to hope. Thus, companies or institutions, in order to maintain themselves over the long term and in a logic of progress in areas such as management and customer relations, are part of the quality approach (ISO 9001 version 2015, p.6).

Standardization is the modern strategic and managerial tool that meets this need for companies throughout the world and in Africa in particular. In Côte d'Ivoire, with the sensitisation of Côte d'Ivoire Normalisation (CODINORM), all sectors of activity are in the process of becoming part of the quality approach. From industry to the tertiary (service) sector, from the private to the public sector, all companies have understood the rule: quality has become an indispensable ally of progress. Moreover, since the Rio Conference on the Environment in 1992, the desire to protect the environment has become a necessity for companies. Thus, they must take environmental, social and economic actions in order to achieve sustainable development.

With this in mind, the Ivory Coast Oil Stocks Management Company has decided to embark on an Environmental Management System (EMS) approach. Unfortunately, GESTOCI is struggling to master the methodology integrating the actions to be carried out proposed by the ISO 14001 version 2015 standard in its implementation. The aim of this study is to highlight the non-conformities in solid waste management at GESTOCI. To achieve this, the following methodology has been adopted.

MATERIALS AND METHODS

1.1-Synthetic presentation of the GESTOCI

A public limited company with a capital of FCFA 240,000,000, the company for the management of oil stocks of Côte d'Ivoire (GESTOCI) was created on 14 September 1983. Since that date, the regulation of oil activity in Côte d'Ivoire requires companies distributing petroleum products to set up a permanent company:



- A security stock corresponding to 2 months of their average sales;
- A tool stock (operational) corresponding to one ½ month of their average sales.

By entrusting this strategic role to GESTOCI, the State's major objective is to protect Côte d'Ivoire from any disruption and/or crisis in the supply of petroleum products.

In accordance with its articles of association, the main activities of the GESTOCI are as follows:

- To store hydrocarbons in quality and quantity to constitute security stocks;
- Storing petroleum products on behalf of private national and non-national operators;
- To deliver petroleum products to approved distributors;
- To manage and maintain the installations, equipment and materials necessary for the operation.

To ensure and succeed in its mission, GESTOCI has three depots with a total capacity of 433,400 M3 distributed as follows:

- The Bouaké depot, with a capacity of 48,000 M3, is out of service following the military crisis of 2002. Studies are underway for its rehabilitation.
- The Yamoussoukro depot with a capacity of 61,000 M3 is supplied with multi-products by pipeline since 2014, its service area has been extended to take into account the closure of the Bouaké depot. It now covers the centre, north, west and hinterland (Burkina Faso, Mali).
- The depot of the Abidjan-Vridi Oil Terminal (TPAV) with a capacity of 324,000 M3 that is the subject of this study is located in Vridi in the commune of Port-Bouët as shown in Figure 1 and is supplied by SIR and SMB. The Abidjan depot can also receive or load oil tankers from the 4 wharves (PETROCI, PUMA ENERGY, SIAP, PETROCI SOUTES).

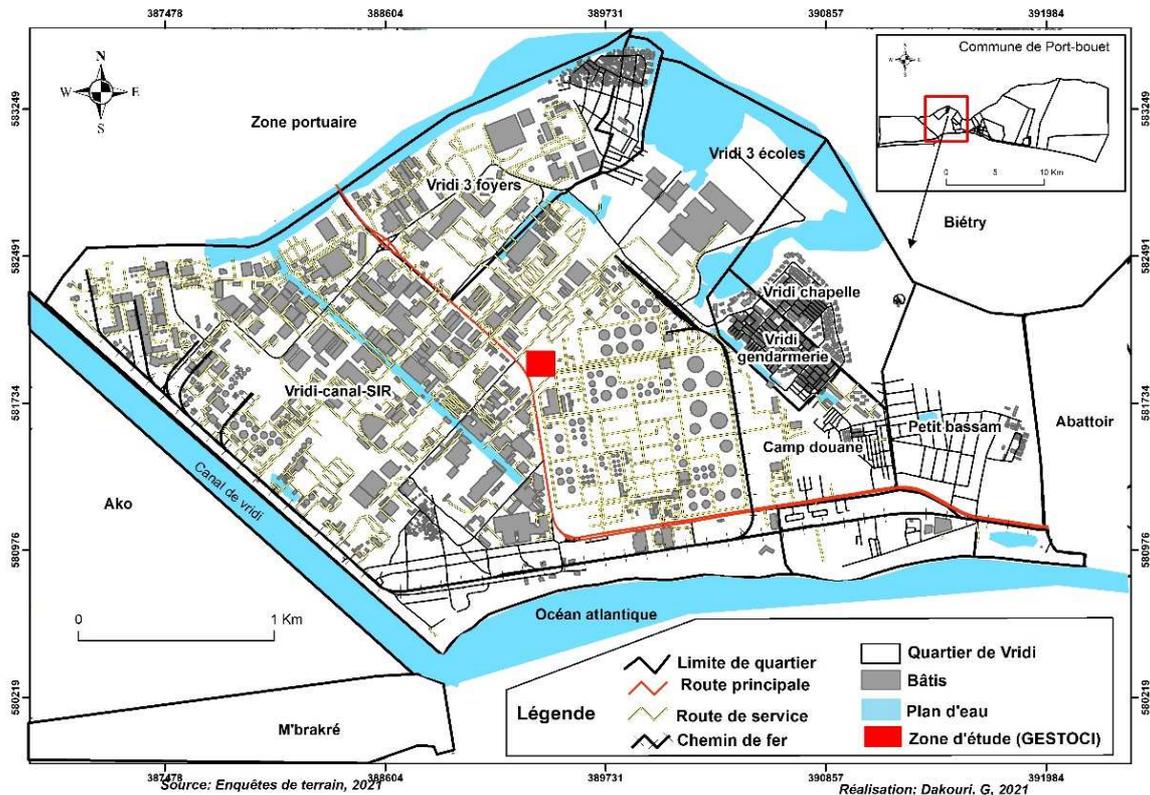


Figure 1 : Localisation de la GESTOCI à Vridi dans la commune de Port-Bouët

1.2-Method of data collection

The backbone of the methodological approach that enabled this study to be carried out is made up of documentary research, the diagnostic interview based on the requirements of the ISO 14001 version 2015 standard and the



survey. The documentary research on the subject, carried out in libraries and sometimes on websites, was oriented towards documents likely to provide very useful information. This documentation, which offers a global and theoretical look at the subject, has made it possible to understand the issues facing the Ivory Coast Oil Stocks Management Company.

The diagnostic interview is an important step in the implementation of an environmental management approach. It made it possible to highlight the level of GESTOCI's environmental management before any improvement action. The aim of this quality diagnosis is to measure the gaps between GESTOCI's actual practices in solid waste management and the requirements of the ISO 14001 Version 2015 standard. The diagnosis is thus a tool to assist in evaluation, enabling the strengths and weaknesses of GESTOCI to be identified, with a view to highlighting all the improvement actions to be carried out (by making recommendations). It made it possible to collect and analyse data on the GESTOCI relating to its organisation, functioning and processes.

This diagnosis is based on:

- Interviews with administrative staff and workers in order to understand the problems they face and the dysfunctions relating to processes. This interview was carried out using a questionnaire (checklist) drawn up by transforming the requirements of the ISO 14001 version 2015 standard into questions.
- The comparison of GESTOCI's practices with the requirements of the ISO 14001 version 2015 standard, in order to highlight discrepancies and make useful recommendations.
- A staff evaluation survey on environmental management. The aim of this survey is to: measure the level of knowledge of the personnel with regard to the concept of environmental management; measure their motivation for implementing the environmental management system approach and identify the factors that they consider to be obstacles to its implementation.

On the basis of the above, the survey questionnaire focused on three concepts: understanding of the environmental management system; blocking factors and training in the environmental management system. The survey conducted from September to December 2020 was participatory and allowed the information contained in the literature to be checked in order to lay the foundations for a rigorous argument. Quality tools such as Brainstorming, QQQCP and Ishikawa diagram reinforced these techniques and allowed a wider view of the starting situation and a diversity of responses and proposals.

The principle that prevailed for the constitution of the sample was that of information saturation. In other words, a precise sample size was not defined from the outset. The interviews within each target group continued until the information saturation threshold, which is the threshold at which the responses provided within a target group no longer vary (Pirès, 1997), was reached. A total of 52 people made up the reasoned choice sample in view of the saturation threshold. In detail, 32 GESTOCI officials and 20 workers were interviewed. The methodology adopted made it possible to structure the present work on the following points: the state of play of GESTOCI following the diagnostic audit, analysis of the results of the diagnostic audit and recommendations.

RESULTS AND DISCUSSION

2.1- GESTOCI's state of play following the diagnostic audit

In order to better understand the difficulties of solid waste management on the site, a thorough diagnosis of the current state should be carried out in order to set priorities. This diagnosis should enable the existing situation to be compared with the requirements of the ISO 14001 version 2015 standard in order to better understand the organisation's initial organisation in relation to the Environmental Management System (EMS). Thus, in order to better assess the level of solid waste management on the site, a measurement profile of the diagnostic audit was drawn up (table 1). It is obtained by comparing the requirements of the ISO 14001 version 2015 standard with the data from the initial diagnosis.

*Table 1: Initial state of EMS after the diagnostic audit*

	Level 1: The action is not carried out or is carried out in a very random manner	Level 2: The action is sometimes carried out informally	Level 3: The action is formalised and carried out	Level 4: The action is formalised, carried out, traced and improved.	Total number of requirements
Requirements relating to the context of the organization	3 soit 20 %	10 soit 66.66 %	2 soit 13.33 %	0	15
Exigences relatives au contexte de l'organisation	11 soit 55 %	6 soit 30 %	3 soit 15%	0	20
Planning requirements	15 soit 41.66%	15 soit 41.66%	6 soit 16.66%	0	36
Substrate requirements	10 soit 30.30%	20 soit 60.60%	3 soit 9.1%	0	33
Requirements for carrying out operational activities	5 soit 27.77%	12 soit 66.66%	1 soit 5.55%	0	18
Performance evaluation requirements	35 soit 77.78%	10 soit 22.22%	0	0	45
Requirements for improvement	9 soit 69.23%	2 soit 15.38%	2 soit 15.38%	0	13
Grand total	88 soit 48.88%	74 soit 41.11%	17 soit 9.44 %	0	180

Source: Our field survey, 2020

2.1.1-Dominant use of inappropriate tools in solid waste management

The "Typology" variable makes it possible to grasp the importance and place of the tools to be used in carrying out activities in contact with the site. On an oil site, when using commercially available steel or iron tools, sparks can occur. Air-gas mixtures can explode because of these sparks. In working areas where these mixtures can form or already exist, the formation of flammable sparks must be avoided at all costs. The European directive 1999/92/EC recommends the use of spark-proof tools in ATEX zones. The use of non-sparking tools is just one example of a very important explosion prevention measure in a company. They consist of special copper-based alloys (more precisely beryllium copper, or CuBe). Explosion-proof tooling is therefore the best alternative for application in explosive environments.

However, ordinary tools such as buckets, picks, shovels, daba, brooms, wheelbarrows, rakes as shown in photo 1, 94% of which are used for cleaning solid waste at GESTOCI, are not suitable for such a site.



Photo 1: View of the solid waste collection tools on site
Photo: Dakouri, 2020



2.1.2 The removal of solid waste by a precarious procedure

The method of solid waste removal on site is largely (85% according to the field survey) carried out manually as shown in Figure 2, since during the removal of the product in the large basin after settling, the pumping system for the recovery of the oil is carried out manually. This is in contrast to automatic removal systems, which is carried out during skimming using a hydro-skimming truck.

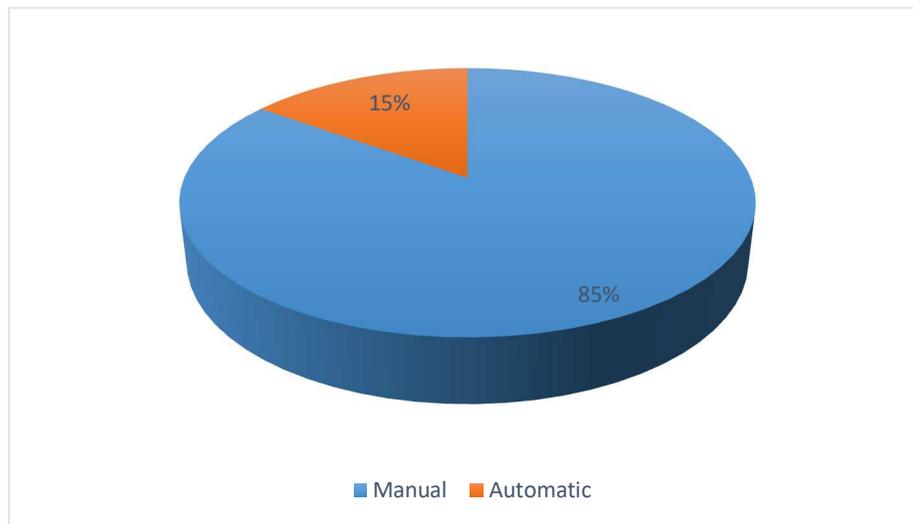


Figure 2: Distribution of solid waste removal mode
Source: Our field survey, 2020

Among the causes of the dysfunction in solid waste management, one can also note, as shown in the Ishikawa diagram (figure 3), the lack of awareness on environmental hygiene, the lack of control of service providers in the field, the lack of rubbish bins on the 30 hectare site and the lack of training of the service providers.

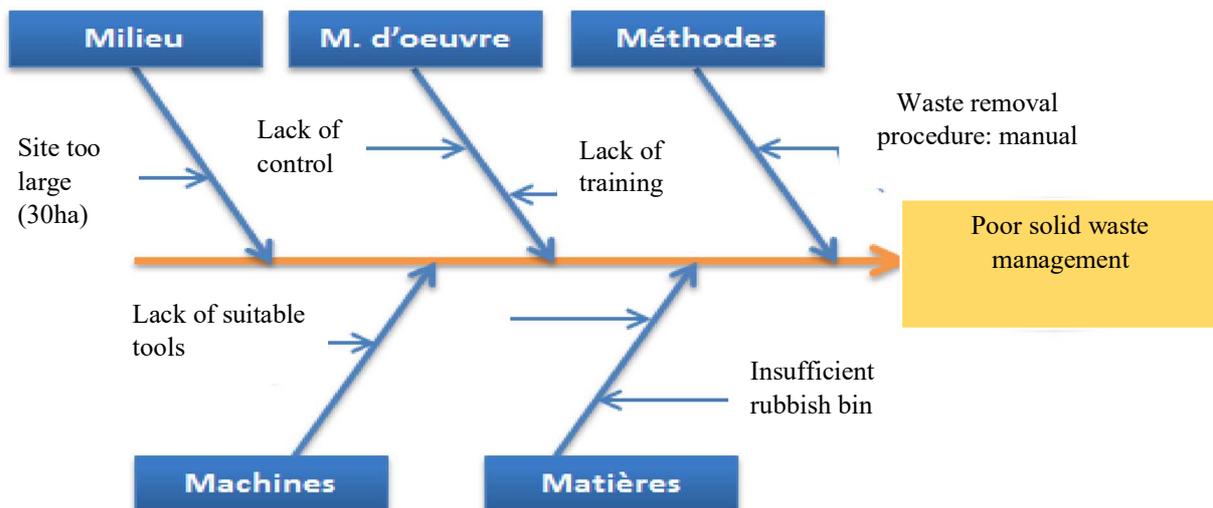


Figure 3: The Ishikawa diagram showing the reasons for mgestion
Source: Our field survey, 2020

At the end of the comparison of the existing situation, i.e. the initial state in relation to the requirements of the ISO 14001 version 2015 standard during the diagnostic audit, the highest rate of conformity (41%) according to figure 4 can be found in chapter 4 of the standard entitled "context of the organisation". In detail, the compliance rate in chapter 5 "leadership", chapter 6 "planning", chapter 7 "support", chapter 8 "carrying out operational activities", chapter 9 "performance assessment" and chapter 10 "improvement" is 24%, 19%, 11%, 16%, 7% and



10% respectively. These rates, well below the average, represent what could be described as good practice in solid waste management at GESTOCI. To this end, adequate measures will have to be taken to make up for the unfulfilled requirements with a view to improving its management system to make it compliant with ISO 14001 version 2015.

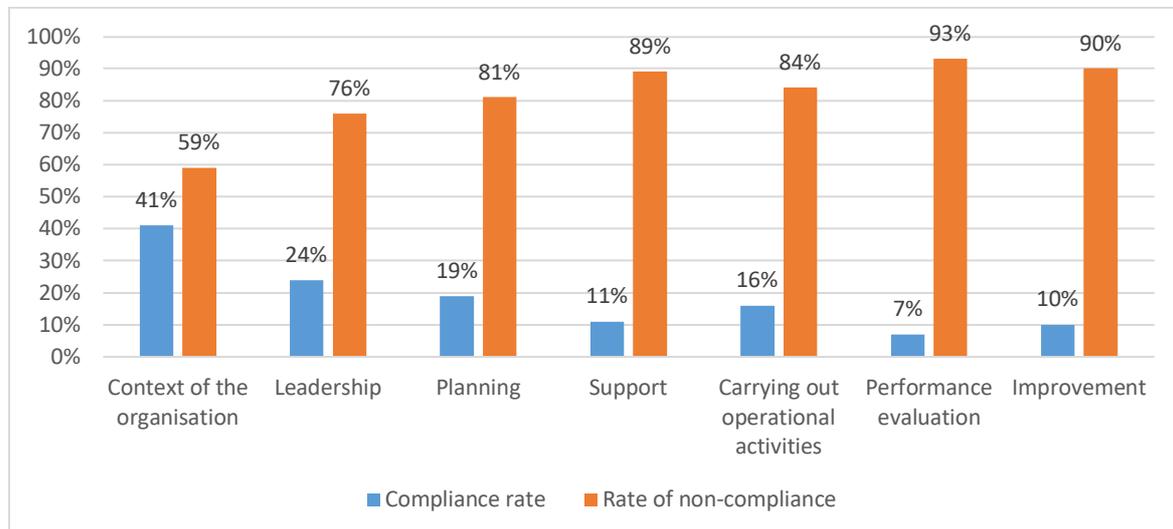


Figure 4: GESTOCI's solid waste management EMS profile in relation to the requirements of ISO 9001 version 2015 Source: Our field survey, 2020

2.2-Analysis of the results of the diagnostic audit

For this study, the term "diagnostic audit" is used since it is a question of identifying non-conformities and finding solutions to them. In this context, the diagnostic audit becomes the cornerstone of the quality improvement process (Fortin S., 1996, p.1) since this diagnosis, while being an essential stage in the process, is presented as also being the initiator of the process. This approach has made it possible to highlight the strengths and weaknesses of GESTOCI in solid waste management. As strong points, we note a declared willingness on the part of the management to launch the Environmental Management System (EMS) approach in order to reaffirm GESTOCI's brand image and meet the requirements of the client and its relevant stakeholders. It shows a willingness to carry out operational activities. Unfortunately, many of the weaknesses that characterise GESTOCI in solid waste management are likely to keep it in a lethargic state. These include the absence of a strategic plan, the non-identification, non-formalization and review of regulatory and customer requirements; the non-formalization of processes within the framework of ISO 14001 version 2015. If GESTOCI's customer orientation at this level is not clearly displayed, the management of documented information remains non-existent. Insufficient staff awareness and communication on the importance of having an effective EMS and complying with the requirements linked to this system hampers the implementation of the approach. The lack of formalisation of responsibilities, authorities and decision-making circuits; the lack of formalisation of the activities and practices of the GESTOCI in solid waste management and the non-compliance with certain regulatory requirements, in this case the requirements of the ISO 14001 version 2015 reference system. The partial removal of waste and the use of unsuitable tools are all weaknesses that make GESTOCI a company lagging behind. This leads Willmott L. and Graci S. R. (2012, p.1) to state that solid waste management represents a crucial, complex, multidimensional challenge for companies. The study conducted by I. Sawadogo (2004, p. 71) in Burkina Faso companies leads to similar results. Thus, to better identify these weaknesses, the analysis uses the seven major chapters of the standard.

2.2.1-Organisational context

This chapter has a 41% compliance rate compared to the normative reference. The following numbered points of the standard are non-existent. It is a strategic plan that contains all the strategic orientations of the GESTOCI (4.1), the requirements for determining the scope of the EMS (4.3) and the EMS requirements (4.4).



2.2.2-Leadership

The compliance rate of 24% in this chapter is due to the following numbered points of the standard not being sufficiently applied or not at all. The requirements for leadership and commitment, i.e. management does not communicate sufficiently on the importance of having an effective EMS and complying with its requirements. There is little incentive, guidance and support for people to contribute to the effectiveness of the EMS (5.1, f, g); continuous improvement is not sufficiently promoted (see 5.1 h). Partial application of the requirements relating to the Environmental Policy and environmental objectives (5.2) and the non-existence of requirements relating to the roles, responsibilities and authorities of the GESTOCI characterised by the absence of job and function sheets for workers (5.3).

2.2.3-Planning

The planning is at 19% compliance rate because the following points of the numbered standard are partially applied or non-existent. These are the requirements relating to environmental aspects (6.1.2), the requirements relating to compliance obligations (6.1.3) and the requirements relating to environmental objectives and the planning of actions to achieve them (6.2).

2.2.4-Support

The compliance rate of 11% implies that most of the requirements in this chapter are not met. This concerns the competence (7.2) of the workers. There is no appropriate documented information as evidence of such competence in solid waste management. In addition, the requirements on awareness (7.3) and communication (7.4) are not applied. In these two points of this chapter, there is also no documented information as evidence of appropriate awareness raising and communication of GESTOCI.

2.2.5-Carrying out operational activities

Operational activities are at a 16% progress rate due to the fact that certain adequate provisions are not in place for the removal of solid waste on the GESTOCI site. There is a lack of formalised procedures and compulsory records with regard to Operational Planning and Control (8.1) and Emergency Preparedness and Response (8.2). Indeed, the GESTOCI fails to establish, implement, control and update the processes necessary to meet the requirements of the environmental management system in the context of solid waste management. The same applies to the processes needed to prepare for and respond to potential emergency situations. Nor is there sufficient documented information to provide assurance that the process(es) in solid waste management is being carried out as intended.

2.2.6-Evaluation of performance

The performance evaluation is 7% because no general chapter requirements are applied. GESTOCI does not have calibrated or verified monitoring, analysis, evaluation and measurement (9.1) equipment used in solid waste management. The lack of a satisfaction survey, the inexistence of internal audit (9.2) and of relevant documented information as evidence of the results of monitoring, measurement, analysis and evaluation, all explain the very low rate of compliance in the chapter. In addition, the management review (9.3) is not carried out in accordance with the standard.

2.2.7-Improvement

This chapter has a 10% compliance rate compared to the normative reference. In the context of solid waste management, GESTOCI does not practice continuous improvement (10.3), as defined by this international standard. Absence of data, objectives and indicators to initiate continuous improvement. No process review; no procedure for managing non-conformities and corrective actions.

2.2.8-Synthesis of the analysis

The aim of implementing an EMS according to ISO 14001 is to satisfy the needs and expectations of customers and interested parties by preventing non-conformities. Analysis of the diagnosis shows that GESTOCI has gaps in solid waste management that it will have to fill in relation to the standard. The main shortcomings noted, relate in particular to the absence of a strategic plan in accordance with the requirements of the ISO 14001 version 2015 standard, which does not allow for the adaptation of solid waste removal, the organisation of its documentary system in the spirit of the ISO 14001 version 2015, the taking into account of regulatory requirements and the points contained in general chapters 9 (Performance assessment) and 10 (Improvement).



Furthermore, it appears that the resources (tools) necessary for the implementation of solid waste management activities at GESTOCI are not sufficiently provided and maintained. To put it plainly, the factors that block the implementation of environmental management in solid waste management at GESTOCI are linked to the organisation, working conditions, lack of training for workers and the lack of communication. Despite this, it has been proven that GESTOCI excels in a few points, such as leadership, management commitment and the availability of competent and experienced staff on which it can rely.

In the light of the analysis of the results of the study, the following recommendations can be made.

RECOMMENDATIONS

3.1-At the level of the organisation's context

At this level, it is important that GESTOCI has a formal strategic plan that will address the relevant internal and external issues, the strategic orientations, the expected results of its EMS and the scope of the EMS. The GESTOCI should draw up an environmental management manual presenting the EMS and identify and describe the processes and assign a pilot (manager) to them. It must also determine the sequence and interaction of these processes, then establish objectives and indicators (scoreboard) to monitor and measure the effectiveness of the processes.

3.2- Leadership

The management of GESTOCI must demonstrate leadership and commitment to EMS and prioritise customer orientation. GESTOCI shall establish a documented environmental policy including its purpose, context and strategic direction. This environmental policy shall also include environmental objectives, management's commitment to meeting customer requirements, legal and regulatory requirements for products and services, and a commitment to continuous improvement of the EMS. The management shall also establish a communication plan for the environmental policy and draw up the organisational documents and documents defining responsibilities and authorities. In other words, it must formalise the structural organisation chart of the GESTOCI in environmental matters, job and function sheets, etc.

3.3-Planning

Within the defined scope of application of the environmental management system, GESTOCI must determine the environmental aspects of its activities, products and services, which it has the means to control and those over which it has the means to have an influence, as well as their associated environmental impacts, in a life cycle perspective. It must determine which aspects have or can have a significant environmental impact, i.e. significant environmental aspects, by means of established criteria. It must communicate its significant environmental aspects to the different levels and functions of the company in an appropriate manner. When planning these actions, GESTOCI must take into account its technological options as well as its financial, operational and commercial requirements.

Furthermore, the GESTOCI shall establish environmental objectives, at the functions and levels concerned, taking into account the significant environmental aspects of the organisation and the associated compliance obligations, and considering its risks and opportunities.

It must consider how actions to achieve its environmental objectives can be integrated into the company's business processes.

3.4-Support

The GESTOCI shall identify and provide the resources necessary for the establishment, implementation, maintenance and continuous improvement of the environmental management system.

The support processes contribute to the smooth running of the other processes, providing them with the necessary resources, both tangible and intangible. For this reason, the human resources required for the effective implementation of the EMS and the implementation and control of the processes must be identified and provided. The commitment of the management to provide the necessary means, especially financial ones, is an important element in order to have the necessary support processes (investments, skills, etc.).

3.5-Realization of operational activities



GESTOCI must establish, implement, control and maintain the processes necessary to meet the requirements of the environmental management system and carry out actions, and prepare for and respond to potential emergency situations identified. It must also control planned modifications, analyse the consequences of unforeseen modifications and, if necessary, take action to limit any negative effects. It must also ensure that outsourced processes are controlled or influenced. The type and degree of control or influence to be applied to processes must be defined within the environmental management system.

3.6-Evaluation of performance

The GESTOCI must determine what needs to be monitored and measured. It shall also determine the methods of monitoring, measurement, analysis and evaluation necessary to ensure the validity of the results; when monitoring and measurement should be carried out; and specify when the results of monitoring and measurement should be analysed and evaluated. The MESTOCI shall evaluate the performance and effectiveness of the quality management system and maintain relevant documented information as evidence of results.

3.7-Improvement

GESTOCI must identify and select opportunities for improvement and undertake all necessary actions to meet the client's requirements (professional environment) and increase client satisfaction. This shall include improving products and services to meet requirements and take into account future needs and expectations; correcting, preventing or reducing undesirable effects; improving the performance and effectiveness of the quality management system. Examples of improvement may include correction, corrective action, continuous improvement, breakthrough change, innovation and reorganisation. This is achieved by first establishing a procedure for managing non-conformities and corrective actions and then deciding on actions for continuous improvement of the quality management system.

CONCLUSION

At the end of this study, it appears that there are large discrepancies in non-conformities according to the ISO 14001 version 2015 standard in solid waste management at GESTOCI. The failure of the waste collection techniques used, on the one hand, and the methods of decontamination, on the other, are some of the aspects of this study that contribute to a better understanding of the poor management of solid waste on the site. The implementation of the EMS in order to demonstrate GESTOCI's ability to regularly supply products that comply with customer requirements and the applicable legal and regulatory requirements, and then to satisfy customers and interested parties, will therefore aim to fill in the gaps between the existing system and the requirements of the ISO 14001 version 2015 standard. Aspects of the standard that are compliant will be improved or formalised. Effective implementation of the recommendations that follow, particularly those relating to the context of the organisation, leadership, planning, performance assessment and improvement, will inevitably provide a solution to the concerns raised and meet the needs of the GESTOCI.

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At the Institute of Tropical Geography (IGT), Félix Houphouët Boigny University of Cocody-Abidjan

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