UNIVERSITY OF GHANA

ASSESSING THE EFFECTIVENESS OF ENVIRONMENTAL MANAGEMENT SYSTEMS: THE CASE OF TEMA OIL REFINERY (TOR)

BY

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THIS LONG ESSAY IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC ADMINISTRATION DEGREE

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DECLARATION

I hereby declare that this long essay is the result of my own research and has not been presented by anyone for any academic award in this or any other university. All references used in the work have been fully acknowledged.

…… ……..…

EBENEZER CUDJOE (10333950) DATE

CERTIFICATION

I do hereby certify that this Long Essay was supervised in accordance with procedures laid down by University of Ghana

…… …….

DR. ALBERT AHENKAN DATE

(SUPERVISOR)

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LIST OF ACRONYMS/ABBREVIATIONS

EAR……...Environmental Assessment Regulations

EMP…….. Environmental Management Planning

EMS…….. Environmental Management Systems

HSSEQ……Health, Safety, Security and Environmental Quality

TOR……Tema Oil Refinery

UNEP…….. United Nations Environmental Programme

Abstract

This research sought to assess the effectiveness of environmental management systems (EMS) at the Tema Oil Refinery (TOR). The study adopted wholly qualitative research design with in-depth interview guide as its main research and data collection instrument. The study employed a sample of twenty (20) respondents. Respondents were made up of members from the human resource, environment, depot management, and transport and tank management as well as members of the health, safety, security and environmental quality (HSSEQ) committees. The study establishes that various activities of TOR have consequential environmental impact on employees, the natural state of the environment and nearby communities. Again, the study has established that the EMS of TOR is implemented through a systematic and robust management scheme beginning from environmental review and consultation, EMS development and planning, EMS implementation, and EMS assessment and evaluation. The research has also identified that, the EMS of TOR is effective in combating the likely environmental impact produced by their operations and this is evidenced through the composition of the EMS like fire risk management, broad EMS system, spills and leakage management, institution of occupational health and safety measures as well as the formation of the health, safety, security and environment committee.

Despite the effectiveness of the system, the study identified financial challenges, delay in review, assessment and evaluation as well as difficulty in identifying environmental impact as impeding the effective and smooth implementation of EMS. Following this, the study recommends that, the company in collaboration with state environmental management units conduct timely EMS assessment whilst offering comprehensive approach in identifying the most likely environmental impact.

CHAPTER ONE

BACKGROUND TO THE STUDY

1.1 Introduction

This section of the long essay discusses the background and problem statement of the study, research aim and research objectives, research questions and significance of the study, theoretical perspectives as well as organization of the research work.

1.2 Background to the study

In recent times, rapid population growth, the drive for industrialization and economic growth coupled with the need for poverty reduction and development in general has led to an unimaginable surge in the level of activities that impact negatively on the environments in all its various forms. Rising growth in the corporate sector with their attendant impact of environmental unfriendly activities has led to rising global temperatures, greenhouse effect, melting magma or ice and encroaching seas amongst others. These have impact on the health and safety of organizational employees and world's population at large. Meanwhile, health and safety of employees as well as nation's people are considered an essential prerequisite for national growth and development.

The activities of organization's and their impacts to the health and safety of employees and citizens in general has led to a general outcry on the need for implementation of various environmental management schemes. Common among the agenda for environmental management has been the environmental movement which occurred in the sixties resulting in the publication of the book, "Silent Spring" authored by Rachel Carson (Wenk 2005), the Earth day summit in the 1970's where almost 150 countries participated (Christofferson 2004).

This outcry has seen an increasing pace of introduction of Environmental Management Systems (hereafter referred to as EMS) both in the local and International stage. Among the list of globally recognized Environmental Management Systems (EMS) are the Internationalization Standardization Organization (hereafter referred to as ISO) 14001 (ISO 14001),British Standard 7760 (BS 7760) and the European Eco-Management and Auditing Scheme (EMAS), (Hunter et al., 2007).Aside the International recognition for environmental management, individual countries have also signed various international declarations and formulated laws and policies that seek to govern the environment. The primary objective of the need for institution of environmental management systems is to offer a systematic and administrative mechanisms or structure that can be employed to incorporate a vibrant environmental management system in organizational settings.

In the case of Ghana, for instance, the government in 1999 formulated and adopted the Environmental Assessment Regulations (EAR) law. The law which forms part of the mechanisms by the Environmental Protection Agency (hereafter referred to as EPA) requires various environmentally related co-corporations to develop and implement Environmental Management Plans (hereafter referred to as EMP) with the aim to reducing the environmental impact of their operations. The EAR section 24 sub-sections 1, 3 and 4 states that;

(1) The person responsible for an undertaking in respect of which a preliminary environmental report or an environmental impact statement has been approved shall submit to the Agency an environmental management plan (EMP) in respect of his operations within 18 months of commencement of operations and thereafter every 3 years

3) The environmental management plan shall be a document in such form as shall be determined by the Agency.

(4) The environmental management plan shall set out steps that are intended to be taken to manage any significant environmental impact that may result from the operation of the undertaking.

By the promulgation of this law then, it becomes mandatory of all public and private sector organizations whose operations impact on the environment in one way or the other to prepare, submit and implement their EMS or EMP as a means to safeguarding their employees, citizens and the general state of the environmental in collaboration with the national Environmental Protection Agency, (EPA). To this end, the Tema Oil Refinery (TOR), an environmentally operations-based agency has instituted an EMS towards its operations.

1.3 Problem Statement

Occupational health and safety, environmental, and quality (Hereafter referred to as SEQ) issues are regarded as necessary to the growth and development of mankind and society as well. Thus far, environmental health and safety issues have become central to policy makers, International Organizations, corporate bodies and governments in respective countries around the world. This recognition of the importance of SEQ has been occasioned by the need to put environment and safety issues at the radar of individual people, organizations and government. It has also been established that, issues of the environment are caused by mankind with their attendant several unfriendly activities and that attention is needed to safeguard mankind and the environment as well.

Following this, the United Nations Environmental Programme (UNEP) and the 1972 Stockholm conference on the environment in which almost all member countries of the United Nations (hereafter termed as UN)have all given prominence on the state and the need to safeguard the environment (Hunter et al., 2007 as cited in Nukpezah, 2010).The prominence of the

environment to the UNEP and the 1972 Stockholm conference has led to the development of guidelines for the management and protection of the environment. One critical area of environmental operations has been the activities of individual people, organizations, both public and private.

Ghana was however a participant in the 1972 Stockholm conference and also a member of the UNEP which led to the sudden promulgation of the 1999 Environmental Assessment Regulation (hereafter known as EAR) which sets the pace and the regulation for all organizations operating in relation to the environment to development environmental management systems and tools as a means of safeguarding the impacts of their operations on the environment. The EAR thus requires all organizations to prepare an EMS for consideration to the Environmental Protection Agency (Known hereafter as EPA). This has seen most organizations like the Tema Oil Refinery (known hereafter as TOR) design and implements EMS.

1.4Research Goal

The overall goal of this study is to examine the effectiveness of Environmental Management System (EMS) of Tema Oil Refinery.

1.5 Research Objectives

The specifics objectives of the study are;

1. To examine the environmental effects of the operations of TOR
2. To evaluate the implementation of EMS at TOR.
3. To examine the effectiveness of EMS of TOR
4. To identify the challenges faced by the TOR in implementing its EMS.

1.6 Research Questions

1. What are the environmental effects of TOR's operations?
2. How is the EMS of TOR being implemented?
3. How effective is the EMS of TOR?
4. What challenges does the TOR face in the implementation of its EMS?

1.7 Significance of the Study

The conduct of this research seeks to achieve the following importance;

First, when this research work is conducted, it will bring to the limelight the importance of EMS to the operations and activities of organizations that impact on the safety of the environment and workers as well. By this, organizations and individual staff will have fore knowledge of the need for the development and implementation of EMS as a means to safeguarding the health of workers, ordinary citizens and the quality of the environment.

Secondly, this study will help in examining the various challenges faced by the TOR in its implementation of EMS. This will go a long way to help the organization in remedying the actions and challenges being met in the implementation process of the EMS in the organization. By exposing the challenges of the EMS implementation, and its subsequent remedial action, the environmental hazards caused by the TOR through its numerous unfriendly environmental activities will reduce drastically.

Finally, the conduct of the study will lead to the examination of whether the processes of the EMS implementation in the organization is effective or otherwise as well as the impacts of the activities of the organization on the health and safety of employees and the state of the

environment. Such knowledge will aid in fashioning out models and tools for strengthening the implementation process of the EMS if the study finds out the process is flawed

1.8 Organization of the Research Work

This study is organized into five different chapters. Chapter one entails the background to the study, problem statement, research goal, objective and research question, theoretical frame work and the organization of the study. Chapter two presents the literature review whereas chapter three covers the research methodology. Chapter four embodies the discussions and analysis with chapter five detailing the summary, conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Generally, every company's survival in terms of growth and productivity in all the various operational facets depends largely on various factors. One such a factor necessary for organizational growth and development is the management of the environment. This is particularly so as the safety, health and environmental factors of organizational management forms the core of effective and efficient human resource management. However, in most cases, other factors like finances have been given priority in organizational settings more than the management of the environment. This second chapter of the research work takes on a critical examination of the concept of Environmental Management Planning (EMP), Environmental Policy

2.2 The concept of Environmental Management Systems (EMS)

An Environmental Management System (EMS) encompasses the set of processes, policies and practices developed and implemented by an organization towards the management and reduction of its environmental impacts and increase its operating efficiency, Mitchel (2002). An environmental management system (EMS) is a voluntary management system instituted by organizations with the aim to identifying, controlling and monitoring a company's environmentally related activities which mostly likely have impacts on the state and component of the environment. EMS usually provides the structure and consistency for monitoring the day to day activities of the company in relation to the environment and which shifts the focus on the environment from reactive to proactive. Whereas, EMS is voluntary in some countries and arts of the world, others EMS related programs are mandatory. EMS's implementation has increased in

recent times as companies and organizations realize their market and environmental place value UNEP (2005). EMS coordinates, and integrates organizational processes and activities alongside environmental issues by establishing principles that seeks to search for continuous improvement in the relationship between the company and its natural environment. Stated differently, an EMS refers to the set of intensive managerial processes in an organization and which allows them to identify, monitor and control its environmental impacts. Environmental Management Systems refers to organization's "structures for managing its processes or activities that transform inputs of resources into products or services which meet the organizations objectives, such as satisfying the customers' quality requirements, complying with regulations or meeting environmental objectives" (ISO, 2005, pg 18). An EMS has been defined by the British Standards Institute (1992) as 'The organizational structure, responsibilities, practices, procedures, and resources for determining and implementing environmental policy".

EMS helps to improve organization's operations processes, financial and economic fortunes, whilst reducing the pace of liabilities either to employees, or communities' various environmental hazards caused. It seeks to make environmental considerations, a central focus and part of each part of company's operations and activities and make each employee subject to the management affairs of the environment. EMS does not aim to directly manage the environment; rather, it seeks to manage companies' activities that give rise to various environmental hazards with the aim to reducing the impacts of such activities on the environment. In short, EMS's focus is on the environmental of the company's activities rather than other areas of organizational management like finances (Hill, 2000 as cited in Lochner, 2005).

2.2.1 Basic Elements of EMS

The development and institution of EMS in organizations have certain basic elements/features,(Hill,2000 as cited in Lochner, 2005**;** Christofferson 2004; Hunter et al., 2007 as in Nukpezah, 2010; Yusof, 2008)

(i) Reviewing the company's environmental objectives and goals;

(ii) Examining its environmental impacts and legal requirements;

(iii) Outlining its environmental objectives and targets to reduce environmental impacts and comply with legal requirements;

(iv) Instituting measures and programs to meet these objectives and targets;

(v) Monitoring and measuring progress in achieving the objectives;

(vi) Ensuring employees' environmental awareness and competence; and

(vii) Reviewing progress of the EMS and making improvements.

2.2.2 Benefit of EMS

The institution of EMS according to Yusof (2008); Rondinelli & Vastag (2000); possesses certain benefits and advantages to organizations in various forms. Among such forms of benefits are outlined as follows;

(i) Cost savings;

(ii) Reduced risk;

(iii) Increased operational efficiency;

(iv) Positive external relations and public image;

(v) Improved communication;

(vi) Greater employee stewardship;

(vii) Shared environmental solutions; and

(viii) Improved public relations.

2.2.3 Environmental Management Systems and ISO (14001)

Standardized EMS such as the ISO 14001 (SIS, 2004), ISO 9000 (SIS, 2000) and the EU Eco-Management and Audit Scheme (EMMAS, 2007)have been designed and approved by world environmental management bodies with the aim to increase the efficient operations of firms, emphasize on customer requirements, and improve communication process between organizations and its various clients and parties. ISO 14001 was introduced evolved in 1996 and were first concentrated much more on manufacturing firms as against other environmentally operating firms. The main objective for the introduction of ISO 14001 were to; satisfy customer requirements, ensure compliance with legal regimes, improve the management of risk, attain goodwill, protect the environment and save more money (Brorson & Larsson, 2006; Almgren & Brorson, 2003). ISO 14001 and EMAS are both product of Deming's 'Plan-Do-Check-Actcycle' with major similarities. However, EMAS require organizations to public regularly, environmental audit report whereas ISO 14001 does not necessarily require such (Peglau, 2007). ISO 14001 is the only blueprint.

Figure 2.1 Environmental Management Systems

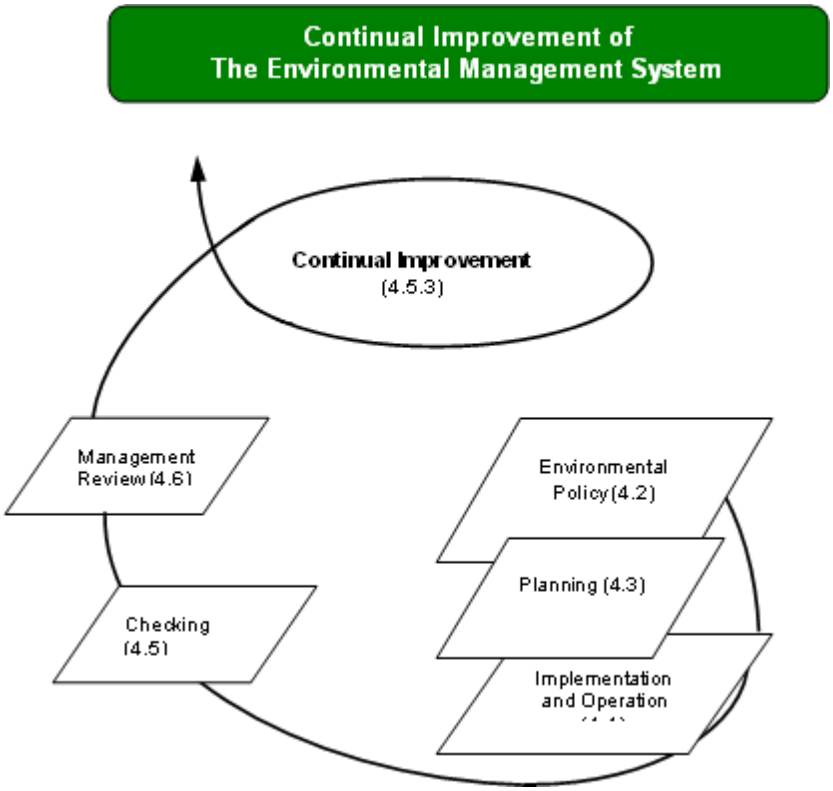

Figure 2-1: ISO 14001 Model (source SS-EN ISO 14 001:2004)

Figure 2.2 Environmental Management Systems

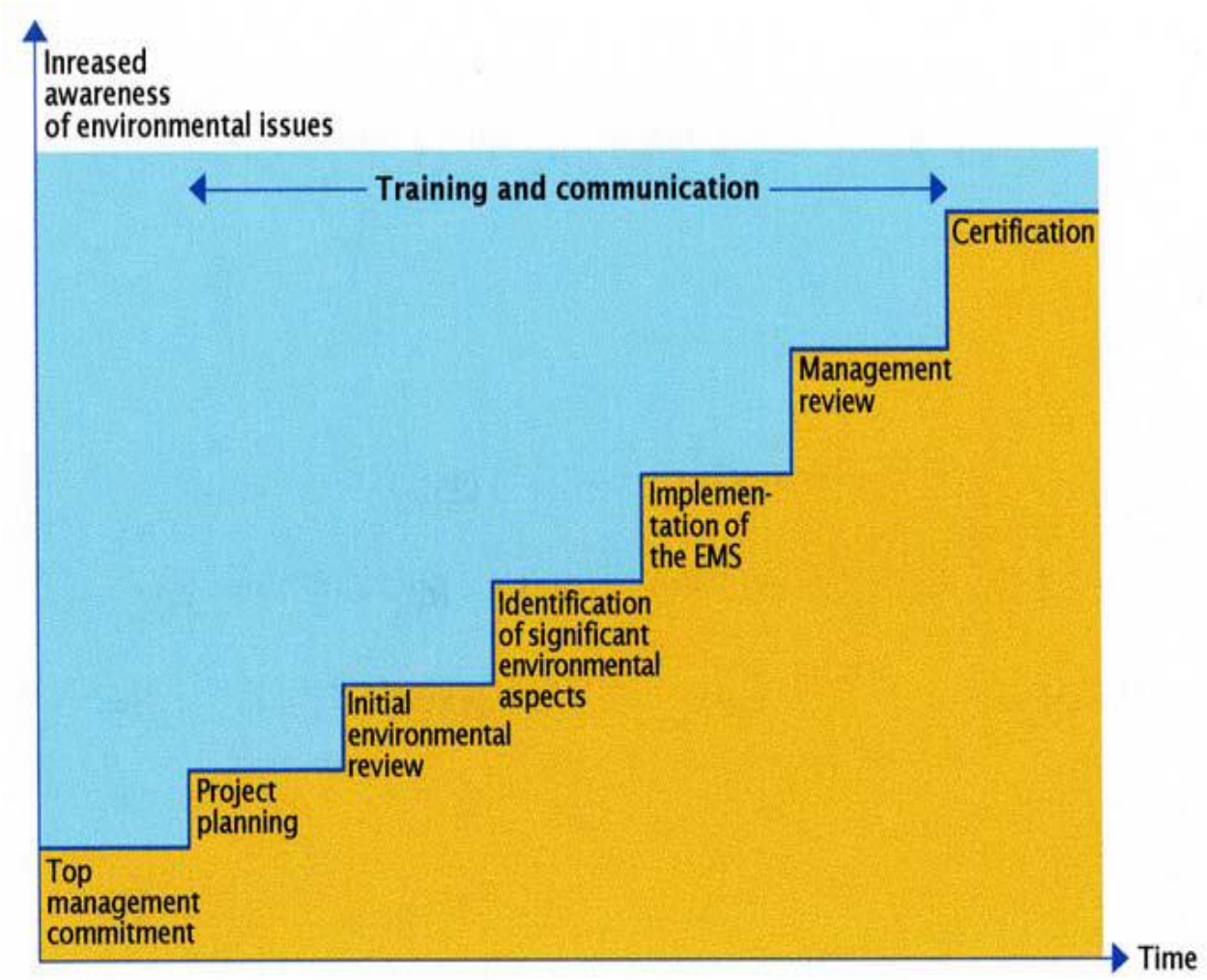

Figure 2.2 Common steps in the implementation of EMS in an organisation.

Source: Brorson & Larsson (2006).

The above two figures, 2.1 and 2.2 present the concept of EMS and its process. Implementation of the EMS can be seen as a stepwise process, in which commitment by management and employees is one of the primary success factors (Daily & Huang, 2001; Summers Raines, 2002; Wee &Quazi, 2005; Zeng, Tam, Tam & Deng, 2005). The entire process of EMP attainment

begins with the commitment and support of organizational management team towards the effort to reducing the environment. It thus moves to project planning when environmental expert and organizational management team meets to plan about the EMP development and its implementation. This stage particularly involves collaboration with environmental management institutions and organizations to consider the concept of EMP development and management. The next stage as indicated by figure 1.2 after project planning is initial environmental review. This stage examines the environmental aspects of the organization's operations and thus moves to identification of significant environmental impacts where management critically identifies the various impacts of their company's activities to employees, communities and the environment, generally. Next on the scale is the implementation of the EMS where all policy directives, programmes and activities for safeguarding the environment is implemented thoroughly at the organizational, or institutional levels. The next to this is the review of the impact of the EMS's institution visa-vie the management where management examines the contribution of the presence of EMS towards the management affairs of the environment.

2.3 Overview of Environmental Protection in Ghana

Historically, environmental protection systems and policies in Ghana begun after the 1972 Stockholm Conference on Environmental Protection on Human Environment declared of the need to protect the environment was held by the UN. The declaration numbered 17 states that, *"National institutions of the required capital and requisite human resources must be established by various member states to enable them manage, plan and adopt the necessary measures towards safeguarding the environment whilst ensuring that, there is quality human environment for its people".*

One of the signatory countries to the UN declaration was Ghana. As a result, and following the importance attached to the environment as per the details of the conference and Ghana's signatory to the various declarations, government was mandated to institute measures towards the protection and management of the country's environmental space. One immediate measure of the government of Ghana back home after the conference was the establishment of the Environmental Protection Council under the National Redemption Council Decree 239. The basic aim of the Council was to ensure the protection of the Ghanaian environment by instituting measures, rules and regulations as well as other appropriate state institutions for the achievement of such nationalistic agenda. However, largely, such objective could not be achieved as the Council was not backed by any legal provision that made it a powerful institution of state to take up the management role of the environment (Larsey, 2001). Following the absence of any legal backing of the operations and activities of the Council, it was collapsed leading to the formation of a new machinery of environmental management in the country known as the Supreme Military Council Decree (SMCD-58) in 1976.

The new decree backed by law to manage the environment sought for various information regarding operations of companies and organizations whose activities impacted on the environment. Thus far, the new unit of environmental management began their operations by arresting and demanding information from offenders of various new orders, acts, rules and regulations pertaining to the management affairs of the environment.

Again, as a means of improving the management affairs of Ghanaian environmental space, the government of Ghana at the time enacted Act 490 in 1995 which eventually resulted in the establishment of the Environmental Protection Agency with the sole mandate of establishing the necessary legal, policy and other institutional framework for the management and development

affairs of all environment related activities and programmes in the country (Nukpezah, 2010).Again, the Environmental Protection Agency is to monitor the activities of individuals and organizations, agencies among such others alike, both public and private and streamline their activities in line with the management decisions of the agency.

2.4 Environmental Management and Environmental Policy in Ghana

In Ghana, environmental management is considered key to the government and various state institutions according to the signatory to the Stockholm conference on Human Environment in 1972. Environmental management in Ghana has thus been backed by a national policy framework known as the National Environmental Policy. The policy's aim is to offer accountable environmental management services, provides capacity building, sensitization and education of the general public, provides equitable, due process and environmental justice system, whilst offering global cooperation with Ghana towards the management affairs of the environment; providing inclusive, cooperation, good governance, among such other valuable nationalistic objectives (EPA, 2016).

The basic idea of such a nationalistic environmental policy towards securing the current and future state of the environment is to provide the framework and impetus for the management and protection of the Ghanaian environment space. The national environmental policy gives credence to the current state of the environment and seeks to provide the necessary environment towards attaining environmental sustainability practices in the country. The national environmental policy is managed by the government under the auspices of the state environmental management institutions like the Environmental Protection Agency (EPA), Ministry of Science and Technology, Minerals Commission, among such other institutions of state. However, various

private organizations also provide the needed support, resources and any other necessary environment for the implementation and effective operationalization of the policy.

Overall, the national environmental policy of Ghana seeks to secure public and national support towards the quest to protect and preserve the environment for unborn children, reversing rapid population growth, economic expansion, persistence poverty, poor governance and institutional weaknesses and failures; improving quality and flow of information, (EPA, 2016). The National Environmental Policy further seeks to educate the general public on the environment, the nature and forms of environment, causes of environmental problems, effects, mitigation measures, individual and organizational roles and responsibilities in protecting the environment; providing a clear conception and framework of the national environmental management and protection agenda in terms of institutions, financial and technical resources alike; establishing international and local collaborations with firms, organizations, government and private sector agencies towards the protection of the environment, instituting measures towards the protection of the current state of environment in terms of resources, capacity, regulations and institutions; taking appropriate measures, irrespective of existing levels of environmental pollution and extent of degradation to control pollution and the importation and use of potentially toxic chemicals; taking appropriate measures to protect critical ecosystems and including the flora and fauna they contain against destructive practices (EPA, 2016; Larsey 2001, as cited in Nukpezah, 2010).

2.5 Environment and Governmental Institutions of Management

Environmental management fundamentally requires the task of duties to particular establishments engaged with directing the utilization of normal assets. In that capacity, various organizations have been built up to guide and co-ordinate all exercises including the allotment of characteristic assets. Benneh (2007) contends that, the fruitful administration of ecological assets in any nation depends to a substantial degree on the viability of the institutional courses of action set up by government for their administration. These institutional plans allude to the kinds of authoritative units included, for example, services, offices, and panels, and to the duties and experts of these units, and the connections between them.

2.5.1 Institutional Structure

At the national dimension, there are three ministries associated with environmental management. The Ministry of Local Government and Rural Development (MLGRD), and the Ministry of Water Resources Works and Housing (MWRWH) and the Ministry of Environment, Science and Technology, adds to arrangement making, setting guidelines, and protection of the environment.

2.5.2 Ministry of Local Government and Rural Development (MLGRD)

MLGRD is the lead organization in the sanitation segment. It is in charge of making and organizing sanitation approach, issuing rules on sanitation administrations and their administration, and for administering the National Environmental Sanitation Policy Coordinating Council (MLGRD, 1999). In principle, institutional duties regarding sanitation are clear, with the Ministry of Local Government and Rural Development (MLGRD) having generally duty regarding defining ecological sanitation arrangements.

2.5.3 Ministry of Environment, Science and Technology (MEST)

The Ministry of Environment, Science and Technology exist to build up a solid national logical and mechanical base for quickened practical improvement of the nation to upgrade the personal satisfaction for all. The general goal of MEST is to guarantee quickened financial improvement of the country through the detailing of sound arrangements and an administrative structure to advance the utilization of suitable ecologically cordial, logical and mechanical practices and strategies and the heightening of the use of protected and sound natural practices.

2.5.4 Environmental Protection Agency (EPA)

The Environmental Protection Agency is the main open body in charge of ensuring and enhancing nature in Ghana. Its activity is to ensure that air, land and water are cared for by everybody in the present society, with the goal that tomorrow's ages acquire a cleaner and more advantageous world. The Environmental Protection Agency (EPA) tries to guarantee naturally solid and productive utilization of both inexhaustible and non-sustainable assets, to forestall, diminish, and beyond what many would consider possible, take out contamination and activities that bring down the personal satisfaction; and to apply the lawful procedures in a reasonable, impartial way to guarantee capable ecological conduct in the nation. As indicated by Vodounhessi (2006), the Environmental Protection Agency is exceptionally cooperation arranged which debilitates its administrative capacities. There is additionally, a need to refresh authorization systems for sanitation bye-laws. A few fines are "ludicrously low" and still recorded in British cash (Amoaning, 2006; Republic of Ghana, 1999; Acheampong, 2010).

2.6 Environmental Management Systems and the Laws of Ghana

In the case of Ghana and for the purpose of environmental management, government in the late 1990s formulated the Environmental Assessment Regulations (EAR). EAR forms the set of regulations, laws and orders put forward by the EPA in connection with other state environmental management institutions. The EAR provides the rules that require organizations' whose activities impact on the environment to submit to the EPA and in collaboration adopt measures towards the protection and sustainability of the environment. According to the EAR 1999 as contained in section 24 clause 1, 3 and 4, organizations must provide measures in protection the environment in relation to their activities and operations. Specifically, the EAR 1999, section 24 clauses 1, 3 and 4 posits as follows;

(1) The person responsible for an undertaking in respect of which a preliminary environmental report or an environmental impact statement has been approved shall submit to the Agency an environmental management plan (EMP) in respect of his operations within 18 months of commencement of operations and thereafter every 3 years.

(3) The environmental management plan shall be a document in such form as shall be determined by the Agency.

(4) The environmental management plan shall set out steps that are intended to be taken to manage any significant environmental impact that may result from the operation of the undertaking.

An examination of the 1999 EAR of Ghana puts the country's environmental management system in a right perspective, that is to say that, there existing laws, rules and regulations on EMS in the country and the environmental management bodies are thus required by law to

ensure the implementation and effectiveness of such a policy towards the management and protection of the environment. The presence of the 1999 EAR which mandates the EPA to ensure the protection and safety of the environment thus implies that, EMS is a necessary prerequisite in the operationalization organizations, both public and private. This state thus puts this study in the rights prospects to examine EMS implementation at TOR, an environmentally related activity organization.

2.7 The Environmental Management Plan of TOR

Tema Oil Refinery (TOR) Limited recognizes the potential impacts of its operations on the wellbeing of employees, the environment and surrounding communities. TOR is therefore committed to protecting human health and the environment as we conduct our business of refining crude oil into clean fuels for the market. The company shall strive to continuously improve and attach equal importance to environmental performance in the same manner as all other aspects of the company's business. Objectively, the EMP of TOR seeks to devote adequate resources towards monitoring of discharges, emissions and ambient air quality in accordance with national environmental quality guidelines; ensure compliance with the numerical limits for emissions, discharges and ambient environmental quality by investing in pollution control equipment and paving of external car park; maintain a tier 1 oil spill prevention and response capability; be responsive and responsible to the needs of the community; provide minimum required PPE to staff; and maintain secondary containment bunds around storage tanks.

The EMP of TOR is mandated by the following legal establishment in Ghana; the Environmental Protection Agency Act, 1994 (Act 490); the Environmental Assessment Regulations, 1999 (LI 1652); Fees and Charges (Amendment) Instrument, 2014 (LI 2216) and the National Environmental Quality Guidelines. TOR's current EMP spans across three years, 2015-2018.

2.8 Theoretical Perspective

This study is modeled on the theory of Environmental Policy Integration (EPI). The EPI theory aims at bridging environmental programmes, policies, laws and activities into the management decisions and operations of organizations with the aim to either stop or minimize the likely environmental adverse consequences of their activities and actions as well as operations on the health of organization's employees, community folks and the entire state of the environment. The EPI seeks to make organizations formulate and develop environmental policies and programmes and include in their management affairs of organizations considering the environmentally related operations and their impacts to the society.

According to Underdal (1980:162),EPI is defined as "one where all significant consequences of policy decisions are recognized as decision premises, where policy options are evaluated on the basis of their effects on some aggregate measure of utility, and where the different policy options are consistent with each other". Again, EPI is termed as a process where policies and programmes are integrated into the operations streams of organizations so as to improve the environmental effectiveness and protection strides of the organization (Lenchow, 2002; Lafferty and Hovden, 2003; Nilsson and Persson, 2003). The basic tenet of the EPI is to manage the environmental impacts of organizations by including environmental policies and management procedures into the operations of both government and non-government organizations by making them solely responsible for their operations and environments impacts of their activities. This is to ensure that organizations meet the environmental targets and norms set up by the environmental management unit of government and international bodies Lafferty (2004).

The EPI for effective organizational and environmental management procedures should according to Lafferty and Hovden (2003) encompass the inclusion of environmental goals and

objectives into all the various sectors and stages of organizational policy decisions considering the important of such environmental policy decisions in the operations and management affairs of organizations whereas aggregating the likely environmental impact into a policy directives with the overall commitment to resolving all contradictions between environmental and sectoral policies by giving principled priority to the former over the latter.

A critical examination of the EPI theoretical perspectives depicts of how organizations whose operations has adverse environmental impacts in one way or the other are required to follow due course by developing environmental management policies and/or framework to safeguard the environment from their operations. By this, the study organization, Tema Oil Refinery considering the likely impacts of their operations on the health, safety and state of employees as well as the entire community and the environment as a whole has developed environmental management systems with the aim to safeguard the impact of their operations. Juxtaposing the basic tenets of the EPI with the environmental policy of the TOR, the theory of EPI could be employed to examine the operations and environmental management systems of the organization. This is because, the TOR has in place an environmental management system established primarily to provide directives of their operations in relations to the environment as well as check and safeguard the likely adverse environmental impacts.

By this, the EPI shall be employed to assess the various tenets of the EMS of the TOR, how effective the EMS is, the challenges and most likely measures that can be adapted to minimizing and/or resolving the said challenges bedeviling the effectiveness of the EMS.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology of research used in the study. The methodology section considers the research design, the scope of study and target population, sample size and sampling technique, sources of data as well as data collection instrument. The final part of the chapter also discusses data management and analysis, limitations of the study and the organizational profile.

3.2 Research Design

In this research, qualitative method was chosen using a descriptive approach to gather information on the topic of study. Through descriptive approach, questions on various objectives were set and asked accordingly for the study. By this, respondents' were required to provide answers, descriptions and explanations to the various questions outlined in the interview process. This is because, the understanding, and observation of the respondents were more robust and narrated by descriptive means in relation to the various questions that posed during the data collection process.

3.3 Sources of data

The study used both primary and secondary data. Primary data are data observed or collected directly from first-hand experience. In other words, it is the original data obtained through first-hand investigation. Primary data was gathered through fieldwork by conducting structured interviews during which questions set out on the objectives of the study were directed at the respondents. Questions penciled were explained during the data collection process to the various respondents. The advantage of the primary data for the study was to ascertain first-hand information concerning the topic of investigation so that the researcher could familiarize himself

with the real situation of the study organization. Moreover, this method was employed to offer an opportunity for the researcher to interact extensively and exclusively with the respondents in the study as well as granting the opportunity to amend questions during the interview and data collection process to the understanding of the respondents in the study.

On the other hand, secondary data was needed for the study and was derived from books, report, journals, past thesis and existing related materials on the topic. Secondary materials were considered for this research work as it created the congenial space for the collection of already existing knowledge on the subject of study. Moreover, the consideration of secondary materials for the study was informed by was due to the choice of research methodology for the study.

3.4 Target population

The target population for this study includes staffs of Tema Oil Refinery (TOR) in charge of environmental management. The choice of this group of respondent stems from the fact that they have ample knowledge on the development, management and running affairs of the EMS of the organization and thus have acquired much experience to examine and explain to the research on the position, management and effectiveness or otherwise of the EMS as well as all other issues surrounding it. Respondents included staff of the environment, terminal, fire safety and institutional safety officers.

3.5 Sample size

In all and for the purpose of this study, twenty (20) respondents who are staff and managers of the organization's EMS were sampled for the study. Respondents were drawn from all the various departments, units and/or sections whose activities and roles are in relation to the management of the organization's EMS

3.6 Sample Technique

Purposive and Convenient sampling technique was employed for this research. These two main sampling techniques were considered for study due to the fact that convenient sampling aided in the selection of respondents who were willing and readily available to participate in interviews and without having to disturb the peace or force individual members to participate in the study. Again, convenient sampling technique was employed based on the ease of access to the study organization and employees. Moreover, purposive sampling technique was employed to ensure that only staff who have ample knowledge on the organization's EMS formed part of the study. The table below presents the various participants or respondents in the study.

Table 3.1 Sample Size of Respondents

Positions of Sample size	**Number of Respondents**
GNFS Officer	1
Terminal and Depot managers	4
HHSSEQ	4
Product Coordinator	1
Maintenance Coordinator	1
Customs	1
Line managers	2
Marshalling coordinator	1
Operations manager	2
Human Resource	1
Business Analyst	1
Transport and tank management	1
Total	20

Source: Field data, 2019.

3.7 Instrumentation of Data Collection Procedure

For the purpose of the study, interview method was employed for the study. Interview method was considered to gather primary data from staff of the TOR. The choice for a consideration of this form of research instrument is informed by the fact that; interview methods of data collection usually offers the respondents and researcher the opportunity to have a more formal, connected and robust means of communication and interaction where the respondents and researcher engages each other in a more constructive and interactive process. Moreover, the choice of this instrumentation method is informed by the fact that, it created space for corrections and explanations to be offered to questions during the data collection process by the researcher on the part of the interviewees. Again, interview method was considered as it provided more room for respondent to express themselves as well as elaborates more on the various issues concerning the topic under study. Further, the consideration of the interview method for this study is due to the fact that, the study undertook an in-depth consideration of the EMS activities of the TOR.

3.8 Data Management and Analysis

Data analysis is the interpretation of information gathered during the research activity. For attaining uniformity and coherence, data gathered from the study was put under various themes, otherwise known as thematic analysis. Data gathered from various respondents' groups was collated and grouped under various themes considering the goals and objectives of the research study. In a more comprehensive way, analysis of the data was be done such that, findings that are similar and under the same objective set out for achievement in the study were put together whereas data gathered and sought to be quite different was discussed as such. Emphasis was put on such different data gathered by either bolding or putting them in italicized format during the discussion process.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1Introduction

This fourth chapter of the research work presents the analyses and discussions with regards to the data gathered in "Assessing the Effectiveness of Environmental Management Systems of Firms Operations: The Case of Tema Oil refinery (TOR). Data for analysis and discussions in the study was arrived at through structured and semi structure interview procedure administered to the staff of the study organization particularly employees of the environmental management, safety and human resource unit as well as other line managers whose duties fall in line with the management affairs of employee and environmental safety.

Respondents in the study numbered twenty (20) with representation from various committees, units and departments whose responsibilities falls in line with the management of the environment as well as the safety of employees and communities. Specifically, respondents were drawn from areas included but not limited to Ghana National Fire Service (GNFS), Human Resource Department, Terminal and Depot Management, Ghana Revenue Authority (GRA), Customs Exercise and Preventive Service (CEPS), Health, Safety, Security, Environment and Quality (HHSSEQ) committee, Operations and other line managers.

It is important to mention that all respondents penciled for participation actually took part in the interviews and data collection process thus making response rate quite comprehensive, and convincing of analysis, discussions and subsequent conclusion. Data for the study was analyzed and presented using thematic analysis models with detailed descriptive and explorative modes, charts, graph, tables as well as simple percentages.

4.2Socio Demographic Information of Respondents

Table 4.1: Socio Demographic Information of Respondents

Characteristics	Frequency (20)	Percentage (%)
Gender		
Male	16	80
Female	4	20
Total	20	100.0
Marital Status		
Single	735	
Married	13	65
Total	20	100.0
Level of education		
Post Graduate	14	70
Graduate	6	30
Total	20	100.0
Years of Service		
20years and above	3	15
15-19	4	20
10-14	5	25
5-9	6	30
1-4	2	10
Total	20	100.0

Table 4.1 represents the socio demographic information of respondents in the study organization. Respondents' demographic information examined four main aspects of interviews namely the Gender, marital status, educational qualification and years of service in the organization. On the part of the data gathered of the gender composition of respondents in the study, sixteen (16) of them representing 80% of the entire respondents ratio were males whereas a meager four (4) with a percentage of 20 were females. By these ratios, a larger proportion of respondents in the study could be seen to be males whereas the female composition was far less. However, largely, it is important to mention that, this happening was not orchestrated by the researcher as participant's selection for data collection was in no way influenced by the researcher. Interviewees came from various units whose roles and activities impact on the sustainability and management of the environment and thus gender differences among interviewees resulted from the number of employees of both sexes in place and managing the affairs of the environment.

In the case of marital composition of respondents, whereas thirteen (13) representing a percentage of 65 answered of being married, the remaining seven (7) representing 25% spoke of being single, thus indicating of a greater promotion of employees who doubled as respondents in the study to be married couples.

Again, on the part of educational qualification of respondents, the socio-demographic information shows that all respondents are highly educated and have better understanding of the environmental management schemes of the study organization. This highly evidenced with fourteen (14) respondents being degree holders of all disciplines and six (6) of them holding post graduate degrees.

In relation to the years of service in the organization, respondents' years of being with the company cut across diverse span. As six (6) employees have served between five and nine years, five (5) and four (4) respectively have served between ten and fourteen and fifteen and nineteen respectively with three and two different groups having served for over twenty years and less than five years. The seemingly different years of service rendition among interviewees in the study highly depicts of the high pace of experience of the different employees and which shows the quality of information provided by respondents.

Further, it is important to put on record that, differences among respondents as regards their background information was not in any way influenced by the researcher in this regard. Differences among respondents on their background information was thus the exact information of employees in the organization and which is on record on the data set of the study company. Thus far, it is highly credible to posit that, information on respondents background characteristics were genuine and that respondents represented the study organization in several facets. Again, they were people who have had vast years of experience with the organization and the implementation of EMS. Thus far, they were better put to provide the researcher with the needed information for the conduct of the study and attainment of the set research objectives.

4.3Environmental Effect of the Operations of TOR

According to Sammalisto (2004; 5), one critical aspect in the study of EMS is the identification of the likely environmental impact of the study organization. Thus far, one of the objectives of this study was to identify the potential environmental impact of the activities of TOR. Following this objective, respondents were interviewed as to what the most likely environmental impact will be. In a related and likely manner, respondents outlined various environmental impacts of the activities of TOR both on employees, communities and other related aspect.

A thorough examination of the likely impact of the activities of TOR on the environment, citizens, and communities, put to the limelight's a related set of environmental impact narrated by all the different categories of employees and respondents in the study. Among the outlined environmental impact of the activities of TOR as gathered from the data includes; leakages and spills, gaseous emission from petroleum products, noise nuisance, and injury and worker health risk. In a similar identification of most likely environmental impact in Sweden Universities, Samalisto (2004, p. 5) outlined them as use of energy, travel and transportation, waste and waste management, purchase and procurement, use of paper, chemicals and hazardous waste. All these largely impact on the state of the environment if appropriate measures are not instituted.

Explaining further on the environmental impact, all the twenty (20) respondents explained of a potential impact resulting from leakages and spill of oil and other related products under the management of the organization. Interviewees in the study explained that, in most cases, oil spillage and leakage of petroleum products engaged in the organization could leak and spill from tankers, containers, cars, pipes and other related materials in use during the refinery, transportation. These leakages and spills often result from failure of equipment like the valve, discharge holes, holes in tanks and transmission related failures. When these petro-chemical products are released into the atmosphere, it impacts on the health and safety of surrounding communities as well as employees in the organization. Giving a detailed account of the likely impact from leakage and spills, one respondent put it as

> "*As you can see the refinery, it goes through several processes to get the crude oil complete for usage. The pipes in which these oils are stored and passes could have some damages of sorts. Tankers transporting oils sometimes develop such faults. Spills of oil and other products under the management of TOR could often occur. This has some*

> *damning consequences of management, safety and security as well as environmental managers does not take immediately action. Consequences could be death, disability of any form, air and water pollution, thus threatening the survival of employees and other communities*" (Terminal and Depot Manager, 2019).

Sammalisto & Lindhqvist, (2007), indicated that spills and leakages in the shipping industry of Sweden is one of the numerous factors of environmental damage particularly oil and other petrochemical spills and leaks. Such happening affects the natural position of the environment and impact on the health of employees in the shipping industry as well as water bodies and nearby communities. Owing to this, the shipping industry of Sweden is undergoing series of measures to combat the constant occurrence of spills and leakages.

In another estimation of the environmental impact of TOR's operations, interviewees outlined the effect of fire risk on employees and surrounding communities. Majority of respondents in the study numbering sixteen (16) and representing a whopping 80% response rate indicated that another major area of environmental impact of TOR's operations is fire risk and this results from the nature of petro-chemical products and services rendered by the organization. Respondents explained that, the type of chemicals and oil under the care of the organization are highly volatile in nature, such that, fire outbreak could occur with the slightest mistake at the work place. The occurrence of a possible fire outbreak would ultimately cause damage to life and property of the organization, employees and surrounding communities as well as the entire nation. Fire outbreak could come from spills, exhaust fumes and engines of the turbines and other machines in use on site and other depot as well as any likely flammable object that appears on site. Considering the high endorsement of interviewees on such likely effect, indicates of the seeming influential

impact of such occurrence of their operations on the safety, health and security of employees and the environment alike.

Further, respondents outlined the environmental impact of emission of gases into the atmosphere thus causing various health related impacted for employees and surrounding communities. On the part of interviewees, the activities and operations of TOR results in some cases, the release of gaseous substances into the atmosphere. Mostly, these substances results from the refining, transmission, changing and discharging of various petrochemical products, loading and off-loading of these products like BRV's under the care of the organization. When these high chemical-based products finds their way into the atmosphere they cause several health related effects due to the highly Volatile nature of Organic Compounds (VOCs) thus affecting the quality of air breath by residents, employees and other affected citizens in the society resulting in numerous health complications. The impact of this environmental is potentially explained by a respondent as;

> *"During refinery hours and processing of crude oil as well as undertaking other related duties like loading and off-loading, chemical change among such other highly chemical based activities, the potential of chemicals being released into the atmosphere is high particularly if ample preventive measures are not taken into account before and during the process. When these chemicals are released, the natural air is tampered with, thus causing inhalation challenges, like nausea, dizziness, headaches and other dangerous health complications"* (Operations Manager, TOR, 2019).

Again, noise nuisance, injury and other health related impact were listed by interviewees in the study as some of the impact of the activities of TOR on the environments and its inhabitant. Respondents explained that, activities engaged in by the organization like the loading and off-loading of petrochemical products often produces several rates of noise to nearby communities and its inhabitants. These noise polluting activities cause various health problems for the employees and other people. Again, spillage resulting from leakage could trigger various accidents and other health related challenges for employees as well as other communities thus impacting negatively on the environment and its inhabitant.

4.4 Implementation of Environmental Management Systems at Tema Oil Refinery

A major objective of this study was to examine the implementation scheme or modes of the environmental management systems of Tema Oil Refinery. Owing to the attainment of such a research objective, the researcher posed several questions during the interview process to the respondents, who subsequently answered. It is important to mention first that, interviewees indicated of the EMS of TOR to have a systemic process of implementation and management. Thus far, the subsequent discussion briefly introduces how the system is implemented.

First, according to a larger proportion of respondents, EMS implementation at TOR begins with collaboration and consultation between the TOR, EPA, and Ministry of Environment and Natural Resources as well as other state agencies that may apply. During this collaboration process, the agencies and organizations involved discusses issues of legality as well as the activities and operations of the implementing organizations and how a possible EMS could be drawn towards managing and minimizing the impacts of their activities. This first stage of EMS implementation thus witnesses the boarder consultation among these agencies where all the various likely facets or areas needing attention for effective health, safety and environmental management is

identified. Thus, this stage is often referred to as the preliminary stage. This stage involves a consideration of the activities of the host organization in cognizance of their likely impacts both to the environment and mankind.

Again, in relation to the implementation scheme of EMS at TOR, the environmental management unit if the organization explained that, after a broader consultation with the state and other agencies responsible for the environment has been consulted, the TOR thus develops an environmental management system taking into account the systems, procedures and operations of the organization. This EMS stage is known as the development and planning stage. At this stage, management considers all the issues identified in the institutional consultation process visa-vie the operating schemes as well as likely environmental impact of the activities of the organization. At this stage, EMS are developed with various guidelines, schemes, principles, and modes of managing the environmental impact of the organization. Moreover, the organization after the development of the EMS again submits the document to the environmental management bodies in the country for further screening and consideration. It is at this stage that the EPA and other state institutions either approve or disapprove of the EMS of the organization. Once the EMS has been screened and approved by the EPA, the TOR embarks on its implementation.

On the scale of the scheme of EMS implementation at TOR according to the environmental managers of the organization is the stage if implementation. According to respondents in this category, implementation is the point where the entire EMS policy document of the organization is put into action. At this stage, all preventive and precautionary measures are put into action with the organization committing the needed resources for every aspect of the plan.

In addition to the implementation stage, respondents in the environmental management unit of the TOR indicated that, usually, the last stage in EMS implementation has been the assessment and evaluation stage of the entire EMS system by both the EPA and other associated agencies in collaboration with the TOR. At this stage, according to the environmental managers, all the areas of activities and operations of the organization are outlined compared and contrasted with the EMS and the effectiveness of the system evaluated. Evaluation centers on whether the system has been able to combat the likely environmental impact outlined at the beginning stage of consultation.

Sammalisto (2007) indicated that, EMS implementation in most cases follows a particular systemic direction more especially when ISO1400 is applied. This systemic process usually starts with a review of the likely environmental impact of companies activities together with state environmental management unit which establishes the laws of administration of the environment in a given locality.

In the case of Environmental management systems implementation in Sweden, Sammalisto & Arvidsson,(2005) presented that, it is a collaborative process with environmental management coordinators and the implementing agency like schools which together draw up policies and prgrammes as well as EMS for the prevention and reduction in the rate of environmental impact of their activities.

Environmental coordinators according to Sammalisto & Arvidsson (2005) in Sweden are involved in the entire implementation of EMS such that they are responsible for issuing certification, conducting reviews and renewing future certification of operations.

4.5 Effectiveness of Environmental Management Systems of Tema Oil Refinery

Owing to the achievement of the overall research aim of this study, one critical objective set out was to examine the effectiveness of the environmental management systems of Tema Oil Refinery. Juxtaposing the attainment of this research objective with data collection process, specifically, questions were posed during the interview process. Response gathered on the effectiveness of the system particularly from the environmental management department of the organizations, shows that, for the purpose of examining the system's effectiveness or otherwise, it must be done in accordance with the various broad areas of development, management and implementation of the EMS in place. Considering that, the effectiveness of the system could be evaluated based on the areas of operations, respondents outlined such areas as; Environmental Management Systems (EMS), presence of the Health, Safety, Security and Environment (HSSE) committee, fire management, spills and leakages management, and occupational health and safety schemes.

In a similar study on EMS, Myyrylainen (2013) indicated that the effectiveness of EMS is particularly observed in areas of operations of the study institution and of which are captured with several measures of protection instituted. Outlining some areas of EMS's effectiveness examination, sectors such as EMS improvement, change management, waste management, energy management, and health and safety management were presented. This she argued could some of the critical areas of assessing the strength and/or weaknesses of EMS.

The argument in literature thus shows that, an assessment of EMS could not be done when the system does not embody some aspect of operations of the study. Following this, the present study discusses the areas of need as contained in the EMS of TOR.

(i) Environmental Management Systems (EMS)

According to respondents in the study, particularly those of the environmental management department, the environment is being managed so well by the TOR in relation to the activities and operations of the organization taking into account its interest to have instituted the EMS in the first place. Accordingly, the EMS complies with the rules and regulations of environmental management considering the operations of the TOR. For instance, the environmental management unit head indicated that, according to LI 1652 the organization is required to implement EMS and this has been duly followed. Again, the presence of EMS is accompanied with several facets of management in the organization as the LI calls for annual assessment of the EMS with regards to its functions towards sustaining the environment. The EMS thus has taken into account all components of the operations of the TOR and the environment such that preventive measures are instituted for these areas. Areas include but not limited to the soil, air, and water component of the environment with ample measures towards protecting and preserving it for the society.

Similarly, owing to the importance attached to the environment by the organization, EMS at TOR follows exclusively the laws and regulations of the environmental management institutions and has always passed the test of time through assessment and evaluation by these state institutions thus depicting of the effective and efficient nature of the EMS of TOR. This, particularly according to the environmental manager is an;

> *"Indication of the presence of effective and efficient EMS policies and programs of the TOR and this is also evidence of the fact that the EMS is effective enough" (Environmental Manager, TOR, 2018).*

ii) Presence of the health, safety, security and environment (HSSE) committee

One of the core pillars of the EMP implementation at the TOR has been the formation of the health, safety, security and environment committee in the organization and charged with the primary responsibility of ensuring the safety, protection and conservation of human health and the environment as well. The HSSE Committee of the organization is made up of people from diverse sources and who have responsibility towards the management affairs of the Ghanaian environment and human as well as employee safety and security.

The HSSE ensure the implementation of the health and safety aspect of the organization in cognizance with the environmental impact. The HSSE undertakes the responsibility of institutionalizing health and safety measures in the organizational settings at both depot and other related areas of operations. The committee also organizes safety and health training for organizational employees on all related matters of the environment as well as the health and safety of organizational and community members whose residence approaches the organization. Educational and sensitization workshop are often held on the safety on operational safety at the various depot, distribution and transmission channels as well as all agents of interest that deals with the TOR.

Education programs are centered on the health and safety of employees in organizations. The HSSE also trains employees in the health and safety precautions of the organization. Training includes operational safety, emergency response procedures, the need to use appropriate clothing and equipment at all times, safe machinery and equipment handling. Workers undergo emergency response drill on monthly basis as well as annual training in oil spill response and drills in fire-fighting measures and procedures.

This position corroborate the account of Acheampong (2010) who presented on his examination of environmental planning that, for the purpose of attaining quality health and environmental management systems, mining companies like AngloGold Ashanti has formed various committees and department. One such committee in existence has been the health, safety, security and environment committee which are charged with the sole duty of ensuring the protection of the environment, employees and other communities nearby the operations of such organizations.

Yusof's (2008)also presented that, the highly volatile nature of petrochemical products and activities warrants the presence of appropriate measures and systems in combating the most likely environmental challenges they pose. Following that, any good EMS should thus embrace the institution of such safety committees. Consequently, most organizations whose activities have huge environmental impact require the presence of HSSE to give prominence to the fight against the impact of their activities. Whey such HSSE committees are in place, organizations are able to monitor their activities whilst promoting growth and development.

(iii) Fire Risk Management

Primary data gathered from respondents shows that, fire management is one key areas for examining the effectiveness or otherwise of the EMS of TOR owing to the volatile nature of the organizations' petrochemical operations. Respondents explained that fire outbreak is one of the major environmental hazards of the company's operations and this usually comes from the Loading gantry, and exposure of the fuel storage tank farm, lighting, explosion, chemical, mechanical, electrical etc. General operation safety procedures and firefighting equipment are exhibited at vantage points at the depot such as the loading gantry, administration block and tank farm, and are strictly followed to minimize fire outbreak.

The organization through its EMS has instituted fire-fighting and safety equipment at various deports distribution channels and pipelines as well as turbines, storage and tank farm site. Fire extinguishers, anti-fire pump, fire hose, firm alarms, among such other preventive firefighting measures and instrument have been provided due to the provisions of the EMS. Again, through the EMS, the organization in conjunction with the Ghana National Fire Service has provided additional and standby fire tender equipment for the operation of the organization with expertise from the national agency as well as TOR trained professionals in firefighting equipment stationed for such fire fighting purposes.

The EMS of the organization is the primary system and operational document which has ensured the provision and presence of such firefighting equipment in the organization. Thus far, largely, the organizations' drive in protecting the environment from possible fire outbreak has been occasioned by the presence of the EMS.

This practice at TOR is similar to that of Bulk Oil Storage and Transportation Company (BOST), according to Nukpezah (2010) when he submitted that fire safety has been one of the core pillars in reducing the damning environmental impact of petrochemical based organizations as well as others whose activities do not fall in line with the petrochemical organizations. Accordingly, the BOST and most other organizations have fire risk management schemes and this ensures safety of the environment. It is important to mention that, the TOR also has such a system in place.

(iv) Spills and Leakages Management

A critical issue in the management of petrochemical products and produce has been the issue of spills and leakages. Spills and leakages often evolve around damaged tanks, pipe lines and many such other happenings in the course of production, transmission, offloading and many such other activities involved in the management of petrochemical and highly volatile products. The EMS

of the organization has due to the constant issue of spills and leakages made the management, causes and affect of spills and leakages a central focus. Currently, spills and leakage has been met with several management procedures which has resulted in the provision of several machines, equipment and tanks as well as routine maintenance of these equipment in the production of petrochemical products in the organization.

(v) Occupational health and safety management

Another area of importance which has been provided and attained much effectiveness by the EMS has been the health and safety aspect of employees, agents and businesses dealing with the organization as well as clients. Consequently, and for the purpose of obtaining and maintain the safety and health of all stakeholders in the organization, the EMS has established safety and health standards and procedures for the attainment of such organizational and national health objective. These standards operating procedures are largely in support by the Labor Act 2003, Factory, Offices and Shops Act 1970 (Act 328) among such other and other provisions. In relation to this, the EMS in conjunction with other labor and health provisions has being undertaking occupational health and safety audit as means to achieving the environment free of injuries and casualties. The EMS of TOR discusses various aspect of occupational health like occupational health and safety policy; safety induction; provision and use of personal protective equipment; provision of warning notices and signage; fire risk management; general housekeeping; safety in the working environment, including gaseous fumes inhalation; first aid and medical care; and Security.

4.6 Challenges of Implementing EMS Systems at Tema Oil Refinery

The fourth objective set out towards the accomplishment of the overall research goal was to examine the challenges confronting the smooth implementation of EMS at the TOR. Owing to the attainment of such a research objective, respondents were interviewed in relation to this. An important issue in the data gathered on this particular objective is that, most challenges confronting the system could only be mentioned by the environment and operations management department as well as members of the HSSE with most respondent explaining of not having much insight into the challenges of the system. Respondents who answered in the affirmative of the challenges to the system explained them as follows;

First, respondents who answered to this question mentioned one major challenge to the system as high cost of equipment and machinery as well as the running the EMS. Respondents explained that, the EMS provides guidelines and systematic procedures for ensuring employee and environmental safety. This safety and precautionary as well as sustainability measures requires the purchasing of various sums of equipment and tools for safeguarding the environment and protecting citizens and employees alike. Among such equipment for purchasing includes fire prevention equipment, repairing tanks, damaged tubes and pipes, engines and turbines among such other equipment. Again, the protection of employees warrants the purchasing and distribution of safety gadgets and equipment like protective clothing and these kinds of expenses largely put a strain on the finances of the company as such equipment are expensive in nature.

Secondly, respondents identified the challenge of delay in review, assessment and evaluation of the management and effectiveness of EMS. Four (4) of the respondents and making up 20% of the entire respondents size explained that in some cases, the organization's EMS has elapsed the time frame earmarked for implementation and of which a different EMS or review is supposed to

be made just so as to enable them draw a new EMS. However, largely, state institutions responsible for the assessment and evaluation of EMS delay in the process of assessment and this to some extent impact on the speedily and effective nature of EMS process in the organization.

Finally, a larger proportion of respondents representing 60%with a frequency of 16 spoke of the challenge in establishing the most environmental unfriendly activities and their impact. Respondents explained further that in the course of developing EMS for the company, they are faced with the difficulty in identifying which operational activities of the organization could impact on the environment.

CHAPTER FIVE

DISCUSSION OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This research work sought to examine the effectiveness of Environmental Management Systems at the Tema Oil Refinery (TOR). This chapter of the research work details the summary, conclusion and appropriate recommendations to the study taking into account the overall and specific research goals set out for achievement by the study. Systematically, the chapter begins with summary of the findings, followed by conclusion and ends with recommendations.

5.2 Summary of Research Findings

For the purpose attaining coherence in this research work, the summary of findings is treated in accordance with the objectives and findings made in the study. Specifically, the summary is organized under the following topics; environmental effects of the operations of TOR; implementation of EMS at TOR; effectiveness of EMS of TOR and; EMS implementation challenges at TOR.

5.2.1 Environmental Effects of the Operations of TOR

As regards the objective of examining the environmental effects of the operations of TOR, interviewees in the study identified likely environmental impacts as leakages and spills, gaseous emission from petroleum products, noise nuisance, and injury and worker health risk. In the case of leakages and spills, interviewees who participated in the study explained that, it is a major issue as mostly, during the course of offloading, transfer, transmissions, preparation and processing of petrochemical products, spills and leakage and often occurs either from tankers, containers, cars, pipes and other related materials in used during the refinery, transportation. Leakages and spills emanate from unfitting pipelines, tankers, among such other things and

could have the potency to impact on the health of employees, stakeholders and surrounding communities.

In another stream, respondents mentioned of the possibility fire gutting at the various depot, transmission and distribution as well as processing and manufacturing site. This is partly so owing to the highly volatile nature of the products engaged in by the organization. This fire gutting possibility has the sequence of damaging property of the organization, communities, and costing the loss of lives. Fire outbreak could occur from spills, exhaust fumes and engines during the processing stage and this impact on lives and health of communities as well as employees.

Another area of concern of the likely environmental impact mentioned by interviews is the release of gases into the atmosphere. Respondents explained that, the organization operates by processing unfinished and semi-finished petrochemical products into finished goods. The processing stage thus follows the high release of gases, smoke and other petrochemical products into the atmosphere, underground water, and water bodies and this interferes with the natural ecosystem. Largely, this impact on the health of its employees and communities nearby thus affecting their wellbeing.

Finally, respondents spoke of the impact of noise produced by vehicles, turbines, processing equipment, tanks among such other high volumes of machines used in the organization as being harmful to some extent on the health of employees and communities. This is particularly, the case as they produce large volumes of sounds and noise thus impacting the health of communities.

5.2.2 Implementation of Environmental Management Systems at Tema Oil Refinery (TOR)

Regarding the management and implementation of EMS at the TOR, respondents who participated in the study indicated of the implementation process being systematic and procedural in nature and comprises of four main different stages, namely, consultation stage, EMS planning and development stage, implementation stage and assessment and evaluation stage.

According to interviews, the consultation stage is the first on the scale of EMS development and management at the TOR. At this stage, the organization collaborates with various environmental management units and agencies so as to come to the understanding of the need, nature, features and requirement of the EMS as well as satisfying all legal mandates in the country. This stage takes also into account all the various areas of operations of the organization and of which EMS should concentrate.

Following on the consultation stage is the planning and development of EMS by the organization. This stage entails the overall process of identifying the critical areas of operation of the organization and upon which various EMS standards, rules and regulations are needed to be drawn. Thus, the EMS development and planning connotes the stage of drawing the overall environmental management plan taking into account the various areas of concern and operation of the organization.

Another stage on the scale is the implementation stage. Respondents posted that, this stage entails the stage of actualization where the overall environmental management system is put into action. At this stage, all the agencies, units and departments as well as personnel in the

organization and other related ones are involved. It entails the composition of teams, groups, committees among such other things for the success of the system.

Finally, interviewees mentioned of assessment and evaluation as the last stage in the management and implementation of EMS at TOR. They explained this by saying that, EMS usually is done for a specific period of time of which during such periods, there is annual review, assessment evaluation of the impact of the system towards reducing the likely environmental impact of the organization's operations.

5.2.3 Effectiveness of Environmental Management Systems at Tema Oil Refinery

In relation to the quest of examining the effectiveness of the system at TOR, the study summarizes it based on five thematic areas of the operationalization of the EMS.

First, on the area of the existence of a sound EMS in the organization, respondents explained that, the EMS is effective owing to its ability to coordinate effectively and efficiently with other state agencies and institutions of environmental management and protection without any challenge whatsoever. Again, respondents explained this by giving an insight on the ability of the EMS to cover vital areas of their operations like air, sea and water bodies as well as human existence and which thus has made the EMS of the organization to pass several assessment and evaluation regimes

Secondly, the effectiveness of the system is witnessed in its institution of the health, safety, security and environment committee (HSSE). According to respondents, the presence of the HSSE committee ensures that, issues of the environment, health and safety are taken a critical consideration with the aim to safeguarding the employees and communities from harm. This

committee thus is made up of expertise who works assiduously for the prevention, protection and sustainability of health, and the environment as well.

Another area of effectiveness of the EMS is the recognition and ability of the system to safeguard the organization and its environment from fire risk. One broad area of need captured by the EMS has been the need to prevent fire risk. Owing to the volatile nature of petrochemical related businesses, fire gutting is one of the most likely disasters. Due to this, the EMS has ensured the purchasing and institution of various forms of firefighting equipment, systems, institutions, education and modes just so as to protect the environment. The EMS has thus ensured, largely, the prevention of fire and protection of the environment from fire risk.

Again, according to respondents, the effectiveness of the EMS is established through the priority granted to spills and leakages occurring in the organization. According to respondents, the EMS has outlined the emergence of constants spills and leakages during operation, transmission and offloading and has thus instituted measures in dealing with damaged tanks, pipes and other such causal factors of leaks, and spills and thus has ensured the total reduction and elimination of spills and leakages in their operations.

Finally, respondents posited of the effectiveness and efficiency of the system to be found in the presence of occupational health and safety management practices in the organization. According to them, the EMS given prominence to safety practices in the organization and this has resulted in the implementation of several schemes as well as the purchasing of varying forms of equipment, tools among such other things and which and which has resulted in the protection of employee and communal health thus resulting in ample protection.

5.2.4 Implementation challenges of Environmental Management Systems at Tema Oil Refinery

Data gathered for the study shows that the EMS at TOR has been challenged with high cost of purchasing goods and materials as well as other equipment needed for attaining maximum environmental, and human protection even though it has largely achieve such since its presence. Such a problem has caused the delay in the purchasing of equipment for the organization and its employees in ensuring safety at work and the community at large.

Again, respondents mentioned poor system of review, assessment and evaluation since most state organizations in charge of environmental management do not take up quickly the task of assessment and evaluations even when time has elapsed.

5.3 Conclusion

Concern for safeguarding the environment and its inhabitant from dangerous and harmful activities has been growing since time immemorial. These concerns have been expressed by various international bodies like UN, EU, AU, non-governmental organizations and even individual state, professionals in academia, think tanks and other such interested parties in the management and protection of the natural habitat. These global, continental and other concerns have resulted in the organization of conferences among such other programs aimed at drawing attention towards protecting and safeguarding the environment. Owing to the significance and attention directed towards the management of the environment, individual states and organizations have instituted measures towards achieving such international and nationalistic objectives. In the case of Ghana, one such organization has been the Tema Oil Refinery which has instituted systems to protect the environment from its petrochemical activities. Thus far, this

study sought to examine how effective the EMS of TOR has been, overtime. Owing to the conduct of the research work on such aim, the study concludes as follows;

First, the study organization (TOR) has various activities that impact on the environment, and its inhabitant in diverse ways and which needed the presence of EMS. Thus, the decision of the organization to draw and implement EMS was a step in the right direction.

Secondly, that, the EMS instituted by the TOR follows a systematic process of management and implementation and this is largely done in consultation and broader consultation with the state environmental management bodies. The systematic and procedural nature of EMS implementation includes the phases of consultation, EMS planning and development, EMS implementation and EMS assessment and Evaluation.

Further, that EMS of TOR has been effective in combatting the various environmental impact of their operations and activities and this is evident from the priority given to areas and systems included but not limited to, EMS, fire risk management, institution of HSSE committee, occupational health and safety and management of spills and leakages by the EMP.

Finally, that the EMS of TOR has been challenged with the financial difficulty which has resulted in limited equipment towards employee, and communal safety.

5.4 Recommendations

Juxtaposing the above findings from the study, it is important the following recommendations are offered for improving the EMS service provision by the company. Thus, the following recommendations are offered;

First, the company should institute measures to increase its budget for the purchasing of safety equipment for employees and stakeholders that deals with the organization.

Secondly, state environmental managers should be proactive in the review, assessment and evaluation of EMS in most institutions in the country.

Again, both TOR and environmental management units in the country should institute measures to ensure a reduction or complete overhaul of the likely impact of spillage and leakages resulting from the activities and operations of TOR.

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APPENDIX

UNIVERSITY OF GHANA

DEPARTMENT OF PUBLIC ADMINISTRATION AND HEALTH SERVICES MANAGEMENT

INTERVIEW GUIDE FOR DATA COLLECTION

OBJECTIVE

This study seeks to assess the effectiveness of Environmental Management System of Tema Oil Refinery (TOR)

The researcher is a final year Master of Public Administration student of the University of Ghana. This research is being undertaken as part of the requirement for award of **Master of Public Administration Degree.**

Your participation in the study is highly essential. Please note that, information provided in the course of question answering is purely for academic purposes only.

Part A*:* Background Information of Respondent

1. Sex: Male ( ) female ( )

2. Marital status: married ( ) single ( )

3. Educational qualification: O‟ Level/SSS ( ) NVTI/Secretarial School ( ) Training College ( ) Polytechnic ( ) University Graduate ( ) Post Graduate ( )

Others (specify) …….

4. Current job position ……

PART B

1. Can you please tell me about the EMP of TOR, What is all about?.....
2. How long have you been practicing this plan?.....
3. What can you say is the activities of TOR?
4. Do you think your activities have some environmental effects? If yes Explain
5. How is the environmental management plan being implemented in your organization?
6. Do you think the implementation process or scheme is good enough? Explain
7. Has the plan being effective in relation to combatting the environmental impact? Yes ( )

   No ( )
8. If yes, can you tell me some of the success of the plan so far?
9. Do you think there are some challenges affecting the plan?
10. If "yes" can you please share some of those challenges with me
11. In the face of these challenges, what do you think can be done to resolve them?