

## **Assessment of Compliance with Environmental Health and Safety Procedures in the Petroleum Downstream Sector – a Case Study of Fuel Service Stations in the Adentan Municipal Area of the Greater Accra Region, Ghana**

SARAH ASIEDUA ASARE<sup>1</sup>, SHINE FRANCIS GBEDEMAH<sup>2</sup>, PATRICK AKWASI ANAMUAH MENSAH<sup>3</sup>

<sup>1</sup>Wisconsin International University College, GHANA

<sup>2</sup>Wisconsin International University College, GHANA

<sup>3</sup>Kwame Nkrumah University of Science and Technology, GHANA

**Abstract:** The petroleum industry is indeed vital to the socio – economic development of any country. Hence the energy used in almost all the sectors of many countries is from this industry. The increasing demand for this products pose risks to human safety and the natural environment through its operations in the petroleum downstream sector in the country. The objective is to; establish the challenges of compliance with the occupational health and safety guidelines of fuel service stations.

This research sought to assess the level of compliance with environmental health and safety procedures in the petroleum downstream of fuel service station FSS in the Adentan Municipal Area. Fifty (50) workers and managers were involved in the research work, 32 were male and 18 were female. The data collected was analyzed using simple descriptive; percentages and frequencies.

**Objective:** The finding of the study also showed that to ensure compliance with regulations; operators regularly embark on inspection and met out the right disciplinary measures to workers who behave contrary to the rules and regulations in the FSS.

It was recommended that, for compliance with environmental health and safety regulation in the petroleum downstream sector to be observe by the OMCs; workers are to be taken through some workshop to help train and develop their attitudes positively. Operators are to take a critical look into top management commitment, cost of implementing polices and workers who are unable to pay attention to details by developing a high level and lasting solution for a conducive environment with good health and safety workplace.

**KeyWords:** compliance, environmental health, safety, downstream sector, petroleum industry, operators, fuel service stations

## 1. Introduction

### 1.1 Background of the study

The function and role of energy (from oil and gas) in the economic, socio-political and environmental spheres of nations cannot be underestimated in our day to day living (Ambisisi, Emeseh & Amezaga, 2014). Hence, the petroleum industry is indeed vital to the socio-economic development of any country. The industry in particular provides energy for almost all the sectors of the economy. The role of the petroleum sector cannot be overemphasized as it contributes greatly to the growth of the economy.

In 2007 when the country discovered oil in commercial quantities, the consumers and the stakeholders of the petroleum sector had a very high expectation of some significant impacts the country stands to gain. In the National Energy Policy (2010), the stakeholders and the consumers were more into the significant role and the contribution of this large discovery of oil in the areas of economic growth, poverty

reduction, job creation and general prosperity of the people in the country but made health, safety and environment their priority (NEP,2010).

The oil and gas industry is basically divided into three sectors: namely upstream, midstream and downstream. The upstream sector is mainly about exploration and production that is; searching for potential underground or underwater crude oil and natural gas fields, drilling exploratory wells, and subsequently drilling and operating the wells that recover and bring the crude oil or raw natural gas to the surface. The midstream is also about transportation (pipelines and shipping), storage and marketing the product. And the downstream sector is a part of the industry that is responsible for the final processing (refining), product distribution and marketing (sales).

According to Ambisisi et al, (2014), these sectors in terms of economics and technological dimensions are interconnected and interdependent. And even though their safety and environmental concerns differ, their

activities are potential threats to human health and environmental risks.

Moreover, one of the segments under the downstream sector that is most often underestimated is the transportation and the distribution systems. According to Ambisizi (2016) it is mostly through pipelines and shipping and its health and safety cannot be overlooked because it account for serious health implications/risks. But in the process of distribution or transportation the most common and vivid evident is the motor vehicle (truck tankers) accident, where roads leading to the location or sites may lack standard shoulders and other safety features. Again due to long driving distance and long working shifts, drive develop fatigue which also constitutes to accidents.

According to the Petroleum (Health, Safety and Environment) Regulations (2017), the L.I 2258 was emphatic, in a regulation that seeks to prevent petroleum hazards on health, safety and the environment. The following are the motives for these regulations;

1. Prevent the adverse effects of petroleum activities on health, safety and environment.
2. Provide the smallest health, safety and environment requirements for

contractors and other persons engaged in petroleum activity

3. Promote high level standards for health, safety and the environment in carrying out a petroleum activity.
4. Contribute to the development and improvement of health, safety and environmental standards.

Health and safety as studied by many in the occupational management are regulations and procedures intended to prevent accident or injury in workplaces or public environments. The health and safety culture is understood as a combination of principles, approaches, and standards capable of contributing and enabling hygienic conduct in business environment. The idea behind health and safety in the downstream sector has over the years been managed and acknowledged as a joint concept considering that it seeks the participation of all organization members (Kelloway & Day, 2005). While the spectacle of health and safety culture in the workplace is theorized by top managers of business companies, nevertheless it is reliant on the involvement of over-all labour force for its operation (ILO, 2013).

According to Lewin, (2003) the downstream sector is an important field in the Oil business by providing power, transportation and the survival of other industrial activities. Moreover,

the downstream sector is a part of the industry that is responsible for final processing, product distribution and marketing. As pointed out by Boateng & Buahing (2014), indigenous Ghanaian Oil marketing companies over the years have dominated the downstream petroleum business.

For the purpose of this study, the focus will be on the downstream sector. All petroleum product retail outlets are included in the petroleum downstream. The petroleum downstream and its related activities are associated with many perils and hazards. As pointed out by Zafar, (2014), there is an intrinsic hazard in the oil and gas industry both in, operational locations and wherever products are transported or used and it is as a result of existence of the flammable hydrocarbons, hence the need to address it across all sectors.

### **1.2 Statement of the Problem**

All over the world, countries into oil and gas productions have regulations and guidelines controlling their industries. To ensure environmental health and safety; the government of Ghana has empowered the National Petroleum Authority (NPA) Act 2005, Act 691 and Environmental Protection Agency (EPA), Act 490 to ensure that fuel servicing stations (FSS) comply with all applicable laws, regulations and practices pertaining to

occupational health and safety and environmental protection.

To control these hazards and prevent them from escalating into major accidents and incidents, there is the need for effective health and safety principles and management that must be adhered to and for the purpose of this study, the focus will be on the downstream sector.

### **1.3. Research Question**

- i. What challenges do operators of FSS face in their compliance with the occupational health and safety guidelines of fuel service stations?

### **1.4 Objective**

The objective of the study is to:

- i. Establish the challenges of compliance with the occupational health and safety guidelines of fuel service stations.

### **1.5 Significance of the Study**

The findings of this new literature together with already available information will ensure that operators in the petroleum downstream industry are acquainted with the culture of health and safety management. The study will also serve as a reference point and a tool for government, policy makers and the industry practitioners for implementation and future policy formulation

for environmental health and safety situations in the country and elsewhere.

### **1.6 Scope of the Study**

The scope of this study is selected Oil Marketing Companies specifically the fuel service stations in the Adentan Municipal Area of the Greater Accra Region of Ghana

## **2. Literature Review**

### **2.1 Introduction**

This section will review theoretical as well as empirical literature on the assessment of compliance with environmental health and safety guidelines of fuel stations. It also contains the following;

### **2.2 Oil Exploration in Ghana**

According to Tullow Oil Ghana (2013), Oil exploration started in Ghana as early as 1896 in the onshore Tano Basin in the Weastern Region of Ghana. In the offshore sector, Ghana had its first commercial hydrocarbons production in 1975 in Saltpond Basin (Amponsah & Opei, 2017) but according to Ampofo (2008) further exploration work had already been done in 1909 and 1913, 1923 and 1925, 1956 and 1957. In 1983, Ghana passed its first law in petroleum, Ghana National Petroleum Corporation law 1983 (PNDCL 64) and it gave legal framework and statutory in accelerating exploration and

production work (Ghana Exploration and Production Forum, 2013).

### **2.3 The Upstream Petroleum Sectors in Ghana**

The upstream industry as elaborated by Charles (1999) is the exploration; evaluation and appraisals, development; production and transportation of crude oil and untreated gas (Charles, 1999, Ambisisi, 2016). Moreover, Niven & Mcleod (2009) pointed out that; ‘Upstream Oil and Gas Operations involve a range of activities, including exploration and drilling, conventional, oil and gas production, extraction and processing of ‘tar sand’, heavy oil processing and pipeline operations.

Notwithstanding, in Ghana the upstream sector is mainly into the hydrocarbon drilling (exploration) and refining with Tema Oil Refinery and Ghana National Petroleum Corporation being the two major entities into the upstream with the latter playing crucial and major roles (Boateng & Buahing, 2014).

### **2.4 The Downstream Petroleum Sector in Ghana**

The downstream sector of the oil and gas lifecycle is the last activity in the petroleum industry/sector. Barclays in its brief report 2015 grouped the downstream into three (3) departments namely; refining (New Build and

Operations), transport (Pipelines and Shipping), retail and distribution (Fuel oil/Petrol, LNG/LPG, Chemicals, Lubricants and others) and according to Buahing & Boateng, (2014) the sector comprises; refining, storage, importation, transportation, distribution and marketing of petroleum products (see Barclays, 2015)

However, not until the discovery of oil in the country (Ghana) in commercial quantities in 2007 the downstream petroleum industry was very few. However, the trend is increasingly changing and growing at a faster rate mostly in the retail and distribution section (Filling Stations) and this is because the demand of the product keeps increasing (Amponsah, & Opei, 2017). A study conducted by Ambituuni, Emesah & Amezaga (2018) in the Petroleum Downstream sector shows that increase in consumption rate of petroleum products has obvious implication for the operations of the product in a country, including risks posed to the natural environment and human safety.

Petroleum downstream industry in Ghana, particularly, fuel service stations are mandated to comply with some environmental health and safety guidelines which are also to meet the rules and the regulations in the sector but in Ghana's downstream industry especially the filling stations; there is little to talk about its

effective health, safety and environmental risks for both the worker and the immediate surroundings.

Such guidelines as well as other procedures are involved in their daily operations within the petroleum downstream industry. The literature of this dissertation will focus mainly on the following areas:

- Safety at workplace
- compliance with environmental health and safety
- control measures of fuel dispensation, transportation and storage

## **2.5 Health and Safety at Workplace**

The concept of health and safety culture has been clarified and situated by diverse scholars and academics in diverse scopes and as defined in WHO healthy workplace framework and model; "A state of complete physical, mental and social well-being and not merely the absence of disease" is a healthy workplace (WHO, 2010). For illustration, some leading scholarly works have characterized and acknowledged the concept of health and safety culture as a practice, conviction or philosophy while some scholars have recognized HSE in expressions of a scheme and mechanism of holding human resource (Fishback & Kantor 2007). Notwithstanding, Alli (2008) in his fundamental principles of occupational health

and safety defined OSH “as the science of anticipation, recognition, evaluation and control of the hazard, arising in or from the workplace that could impair the health and well-being of the worker taking into account the possible impact on the surrounding, communities and the general environment. (Alli, 2008; vii)

A successful administration of employee safety and health safeguard is vital in reducing the statistics and brutality of workstation ailments and damages. To be effective, such management must include the methods to find and understand all hazards, including potential hazards that could result from a change or series of changes in conditions or practices (Quartey & Puplampu, 2012). Then management must either prevent or control those hazards so that workers are not exposed.

To accomplish this, the guidelines are divided into five major elements:

1. health, safety and environmental management
2. management leadership and employee involvement

Each of these elements are discussed below:

### **2.5.1 Health, Safety and Environmental Management**

According to the Health, Safety and Environment HSE, (2000) industries are able to

achieve high performance from their employees if there is effective health, safety and environmental management. Rio Declaration 1992, Principle 4 came out with a challenge that; in order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it. For safety, health and environmental management system, there has been a guideline document published and agreed in 1994 through the industry international exploration and protection forum (UNEP, 1994).

According to Yirenyki (2016) the behavioral and participative approaches are the two main theoretical approaches to health and safety management. And for sustainable approach to risk management, Rowe, (2001) made a strong point that participative approach is the best for development and Baker who propounded these two approaches also viewed the participative as the best management style (Baker, 1990). Therefore, for the best health and safety environment in the downstream sector, management must employ this style of approach. If management will be keen in assessing the environmental risks, health and safety situation in the downstream which may be apparently small within the industry in terms of impact, may help in achieving the bigger interest of the nation. For instance, if job skills

training, project safety, health support schemes and health and safety committees etc (Yirenkyi, 2016) are considered by management through assessment as they facilitate them consistently, then the environmental risks will be controlled.

For effective management system as documented by UNEP (1994), there must be;

1. clear analysis of current practice
2. total commitment from all staff
3. good communication within organization and
4. timely and relevant training.

Finally, the Petroleum Regulation (2017), LI 2258 state it in clearer terms that, management must ensure that, individuals engaged in a petroleum activity are qualified to fulfill all requirements of the regulation relating to health, safety and the environment.

### **2.5.2 Management Leadership and Employee Involvement**

Omar in his recent review of the employee engagement (HRD) literature pointed out that “employee engagement is a huge concept that deals with all parts of human resource management aspect” (Omar, 2016; 528). Therefore, if employees are engaged and involved in the organization, there is a better understanding, improvement and organizational

performance at the workplace and minimization of incidents (Mishra & Sahoo, 2012).

Maslach, Leitei & Schaufeli (2001; 417) defined engagement as “a persistent positive affective state characterized by high levels of activation and pleasure” and employee engagement as the antithesis of burnout.

In an organization, the most important resource is the employee and if there is good interpersonal relationship and supportive management there is psychological safety promotion (Kahn, 1990, Kamau & Sma, 2016). Also when there is management leadership and workers involvement through adequate training for both, performance is high and hazard prevention is ensured (Alli, 2008).

Moreover, when employees have confidence in their organization through trusting leadership there is psychological safety which is employee engagement (Ologbo & Saundah, 2011). Clearly communicating the policy to all employees ensures that no confusion will exist when a conflict arises between two of these values, such as productivity and safety or health.

Finally, involving employees in the roles and responsibilities of the company by the management of the leadership will see significant improvement in its safety and health practices.



## 2.6 Compliance with Environmental Health and Safety

According to Kanyi (2014) compliance is when an agency has to fully meet the requirement of law, regulations, court orders and rules which mandate main discrimination and affirmative action to the latter.

The petroleum regulations act (2017), L.I 2258 points out that ‘a contractor, sub-contractor, licensee, the corporation or any other person engaged in a petroleum activity shall; *take steps to eliminate or reduce risks or hazards to people, the environment or assets in accordance with the regulations and in compliance with the best industry practices*’ (Petroleum Regulation, 2017; 12). The environmental health and safety could have an impact on the health and well-being of the worker or employee and even the populace if not adequately and properly controlled by various companies and industries and in Ghana the National Petroleum Authority (NPA), the Environmental Protection Agency (EPA), Ghana Standard Authority (GSA), National Fire Service (NFS) are the mandatory institutions tasks by Law to inspect and check if fuel filling stations are complying to the standards in the downstream sectors (NPA, 2017). In Ghana, environmental health hazards occur due to ignorance (Yirenkyi. 2014).

According to Oluwagbemi, (2011) the workforce of any company is their greatest asset, hence it is vital to keep and maintain the workplace healthy and safe enough. It is therefore the duty of management to ensure protection for employee of health and safety of the workplace against hazardous situations in the environment and outside the work environment, hence enforcing the standards practice in the industry by complying with the rules and regulations at work place.

As Kelloway & Day 2005 pointed out, the well-being of employee is dependent on the leadership of a company. But as quoted by Jilcha & Kitaw (2016), workplace safety and health has been underestimated in the emerging economies by policy and strategy developers.

In the measuring of the environmental health and safety of the downstream sector, the management need to provide a safer workplace for the workers or employees through hazard identification, facility design and workplace inspection. Dordi (2009) pointed out that environmental health and safety is as important as its affects workers either by the responsibility of the leadership or not.

Therefore, according to Huang & Liang (2013), there must be standard criteria that petroleum industries adhered to for a better environmental protection, health and safety. The following

steps are to be considered in the downstream sector for environmental health and safety (NPA, 2017);

1. There must be immediate and constant inspection of all fuel filling station and vigorous enforcement of existing regulations by the National Petroleum Authority (NPA)
2. Review of current licensing regime to ensure that only those with demonstrable capacity and competence to work in sector for safety and occupational health.
3. Institution of mandatory training and certification of the staff personnel of Regulators, Oil Marketing Companies to ensure the safe handling of the product.
4. There must be combine efforts of the Environmental Protection Agency, National Petroleum Authority, National Fire Service, Ministry of Employment and Labour Relations and Ghana Standard Authority in reviewing the safety protocols throughout the entire value chain in compliance to rules and regulations.
5. Ghana Standard Authority must strengthen and enforce regulation per their guide lines as to how companies handle, store and distribute petroleum product.

6. In an event where there is failure on the part of retail stations, there must be immediate cessation, until further notice of all construction of facilities intended for use as petroleum retail stations.

Moreover, as documented in L.I 2258, for compliance in health and safety plan in the petroleum activity must; have a health and safety plan that is adapted to the scope of the petroleum activity law. Also the health and safety plan shall stipulate and further develop objectives and strategies to improve health and safety in accordance with technological developments, applicable laws and best international practice (Petroleum Regulation, 2017).

The responsibilities should flow logically from the objectives set to meet the overall goal of the safety and health program in compliance to rule and regulations in the industry. The guideline is as follows: assign and communicate responsibility for all aspects of the program, so that managers, supervisors, and employees in all parts of the organization know what performance is expected of them (ILO, 2003).

### **2.7 Control Measures of Fuel Dispensation, Transportation and Storage**

According to Health and Safety Services (2016), one of the most dangerous substances is petroleum. It is extremely flammable liquid

which gives off vapour at room temperature and easily ignite at low concentration (HSS, 2016). Therefore, the most significant ways of handling it from causing fire and explosion is taking into consideration its storage and transportation processes serious. The storage and transportation processes are discussed below:

### **2.7.1 Dispensation**

As pointed out by MOWLAP 2002, the most effective ways of dispensing are establishing a maintenance and operating procedures to prevent spills (FC 4.1.63) and making a dispensing procedures outlined and make it visible for all operators (MOWLAP, 2002).

### **2.7.2 Transportation**

The petroleum products are to be handle with care due to the highly volatile nature and its spillage which can also cause contamination of the surrounding area, therefore its mode of transportation and distribution must be done well (STI Group, 2018), and in the petroleum industry the mode of transporting the oil is through pipelines, shipments, tankers, rails and boats. According to API (2018), the railroad is the most efficient and safe mode of transporting crude oil and other petroleum products. However, in the petroleum sector the oil and gas are moved to the processing site through the pipelines and comparing this to the other modes,

it is more environmentally friendly (STI Group, 2018).

As Ambisisi (2016), pointed out in his work, downstream transportation and distribution of petroleum products are mainly done using truck tanker and pipeline transport system and many accidents on human safety and the environment are connected to these systems. In Ghana, the lack of proper accident prevention from the authorities assigned for tracking petroleum product in the downstream sector has claimed many lives through accidents.

### **2.7.3 Control Measures**

Ambisisi (2016) made it clear that for accident prevention for truck tankers, there must be a need to create a management framework, and there are some countries that has really developed risk management framework to control fuel transportation and storage to meet their policies and practices. According to department of industry and resources (Western Australia), to control the dispensation, transportation and storage of fuel; the location, method of construction, ventilation and installation of fuel transportation, effects (hazard) to persons and other facilities are to be considered (DIR,1997). Moreover, the transportation of fuel must have a load security where on the highway no person shall drive or operate a vehicle carrying load unless it is load

secured (Ministry of water, land and air protection (MOWLAP, 2002). Again the vehicle transporting the fuel must be well maintained from spillage and other flammable material (DIR, 1997)

#### **2.7.4 Storage**

Storage according to AGI is; '*facilities used to ensure a steady supply of important fuels reducing the risks of supply disruption due to natural disaster, conflicts and other major events*' (AGI, 2018, 3). The Health and Safety Services, (2016) documented that to protect against foreseeable incidents; there must be health and safety legislation requirement from the indoor/outdoor storage of oil. In that there should be present in the vehicle or working area the needed quantity and that the legislation should justify the need to store quantities of oil within a vehicle or working area (HSS, 2016). Moreover, in storage of oil, the floor of the area should be constructed of concrete and sloped so that any spillage will flow to a sump contained with the bud, and tanks for the storage of oil should comply with the standard practice in terms of rules and regulations of the country and relevant hazardous substances regulation (DIR, 1997).

### **3. Methodology**

#### **3.1 Introduction**

This chapter discusses the methods used to gather data. It also takes into consideration the following sections;

#### **3.2. Study Area**

The study was done in the Adentan Municipal area which is located in the Greater Accra Region of Ghana. The capital is Adentan and it is located on the Accra-Aburi Highway after Madina. Its area total area is  $92.84\text{km}^2$  (35.85 sq mi) and the total population is 78,215 (Ghana Statistical Service, 2014).

#### **3.3 Research Design**

This research uses the case study design for and within a particular setting with the intension of finding answers to the research questions through the views of respondents.

A survey via questionnaire was used in the study and the information gathering. This method is most appropriate as it enables the study of non-observable events such as opinions, attitudes, preferences or dispositions. Specifically, the study is a survey having individuals (staff of some oil marketing companies) as units of analysis.

### **3.4 Sources of Data-Secondary and Primary**

In carrying out this study, both primary and secondary sources of data were used to gather the information needed for the study.

The secondary source was historical documents as well as reports on previous work that has been done in this area. The primary source was the questionnaire administration. In this study the type of method used was the paper and pencil (questionnaire).

The questionnaire was designed purposely to cover the main research question in order to meet the objective of the work. Moreover, the purpose of the study also informed the researcher in designing a questionnaire that placed emphasis on the following research question: the challenges in the FFS in relation to the environmental health and safety.

### **3.5 Population and Sample**

The workers and managers of all the registered oil marketing companies (OMC) in Ghana constituted the population for the study. But the target population for the study is made up of workers and managers of the registered oil marketing companies in the Adentan Municipal Area.

The sampling technique the researcher used for the study was the purposive sampling, this was

considered for the study because majority of the employees were people with expertise and knowledge in the area being researched. . Altogether, a sample size of 60 workers and managers were considered in total for the research

### **3.6 Data Collection Procedures**

Data was obtained through the administration of questionnaire which is one of the effective and popular methods used to gather information. The data was collected by the researcher by meeting the respondents from the various 20 FFS directly. The respondents were made aware that the options given are not rated wrong or right answers and their professional carrier would not be affected. This was done for free, sincerely and honesty responses from the respondents.

### **3.7 Instrument**

The questionnaire was the research instrument used in generating the primary data for the study. It was structured and designed to measure the research questions and the objectives of the study. It was then grouped into two parts with two (2) sections. Parts 'A' is about demographic data of respondents and contain Section A which consisted of respondents' personal data, Section 'B' consisted of information on the challenges operators of fuel service stations face

in complying with occupational health and safety guidelines in the study area.

### 3.8 Data Analysis Procedures

The responses from the respondents to the various research questions were edited and coded before analyzed. The analysis of the data was done using Statistical Package for Social Sciences (SPSS Version 25.0). The software was used to analyze the frequencies and percentages for the purpose of the study.

## 4. Findings and Discussions

### 4.1 Introduction

This chapter deals with the statistical analysis of the collected data;

*Table 4.1: Gender of respondents*

Gender	Frequency	Percentage (%)
Male	32	64.0
Female	18	36.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

**Source: Field work, 2019**

In reference to table 4.1, the male 32(64.0%) were the majority of the respondents while the minority were female with 18(36%) and this presupposes that in the FSS the male workers are more as compared to the female workers. It

### 4.2 Socio-Demographic Distribution of Respondents

This section presents the demographic aspects of the respondents, and it is mainly of those who have the great bearing on the analysis and interpretation of the collected data on various subjects of the study. The following are the main demographic features of the respondents in this section, gender of respondents, age of respondents, level of Education, position at work and work description.

#### 4.2.1 Gender Distribution of Respondents

Fifty (50) workers and managers were involved in the research work and their gender is displayed in the Table 4.1 below.

shows that in the FSS within the downstream sector the nature of job carried on are not female friendly.

#### 4.2.2 Age Distribution of Respondents

Under this demographic, respondents were given five options to choose one in relation to

their ages as shown in Table 4.2 below. The research sought to find out from the respondents

the age group the OMCs mostly employ as their workers in the FSS.

**Table 4.2: Age distribution of respondents**

Age Group	Number of Respondents	Percentage (%)
18-25 years	25	50.0
26-30 years	16	32.0
31-35 years	7	14.0
Above 30 years	2	4.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

**Source: Field work, 2019**

From Table 4.2, it can be seen that the age (18-25) years had 25(50.0%) which is half of the respondents and the majority, 16(32.0%) are between (26-30) years, the age (31-35) years had 7(14.0%) respondents and 2(4.0%) were above 30 years.

The findings show that the age range or interval most OMCs employed workers for their FSS are below 26 years which clearly shows that most of the workers are the adolescent youth with energy to work for high performance to meet target. Karr (2000) established that the occurrence of occupational injuries decreases

with age but when it does occur its acuteness is very high, hence informing the OMCs in employing few workers when the age is (31 – 35) years and above 30 years. However, Parker, Carl, French & Martin (1994), argued in respect to their findings that there is under reporting cases when adolescents are employed.

**4.2.3 Educational Qualification of Respondents**

The study sought to find out the level of education of the respondents surveyed. The research provided 5 scales for the respondents to choose from. The findings are displayed in Table 4.3 below.

**Table 4.3: Educational qualification of respondents**

Level of Educational	Number of Respondents	Percentage (%)
None	0	0.0
Basic Ed	25	50.0
Diploma/HND	18	36.0
BA/BSC	6	12.0
Masters	1	2.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

**Source: Field work, 2019**

Table 4.3 shows that 0(0.0%) of the respondents had no (None) level of education, 25(50.0%) of the majority had Basic education, Diploma/HND had 18(36.0%) of the respondents, while 6(12.0%) were BA/BSC, only 1(2.0%) of the respondents had Masters.

It can be inferred from table 4.3 that in the FSS the minimum requirement that qualify a person

as a worker is the Basic education and that a worker must be at least able to write and read.

#### 4.2.4 Position of Respondents

The study sought to find out from the respondents their positions as workers and managers of their respective FSS. Four options were presented for respondents to choose one. Table 4.4 below shows the findings.

*Table 4.4: Position of respondents*

Position of Respondents	Number of Respondents	Percentage (%)
Pump Attendant	39	78.0
Station Manager	8	16.0
Compliance Officer	3	6.0
<b>Total</b>	<b>50</b>	<b>100.0</b>



**Source: Field work, 2019**

From Table 4.4, 39(78.0%) it can be seen that majority of the respondents are pump attendants, 8(16%) are station managers while the compliance officers are 3(6%). The 1 person who had the master's degree was a station manager. The high number of pump attendants shows that their demands as in service delivery in the FSS is very high and constants and that, target could only be met if the number of workers in that position is higher. In the case of the numeric strength of the station managers and

the compliance officers the outcome indicates that the OMCs if not due to cost (salary) have to do more by employing more personnel into that area.

**4.2.5 Work Description of Respondents**

Under this demographic data, the study sought to find out the exact work the respondents are assign to by the OMC as worker or a manager. Four working descriptions in the sector were given as options for respondents to choose from and the findings is displayed by Table 4.5 below.

*Table 4.5: Work description of respondents*

<b>Work Description</b>	<b>Number of Respondents</b>	<b>Percentage (%)</b>
-------------------------	------------------------------	-----------------------

Dispenses fuel into customers' vehicles and attends to customers' needs at the fuel pumps	37	74.0
Responsible for the day to day management of operations at the fuel station	9	18.0
Conducts periodic inspections of the facility to ensure compliance to statutory health and safety regulations	3	6.0
Ensures the fuel outlet premises and all facilities within it are cleaned and in good sanitary condition	1	2.0
<b>Total</b>	<b>50</b>	<b>100.0</b>

**Source: Field work, 2019**

With respect to what the respondents do at work, table 4.5 shows 37(74.0%) as the majority dispenses fuel into customers' vehicles and attends to customers' needs at the fuel pumps, 9(18%) of them are responsible for the day to day management of operations at the fuel station while those who conduct periodic inspections of the facility to ensure compliance to statutory

health and safety regulations are 3(6%). Only 1(2.0%) were those who ensure the fuel outlet premises and all facilities within it are cleaned and in good sanitary condition.

This clearly shows that there is more to be done by the OMCs in the area of those who conduct periodic inspections of the facility to ensure compliance to health, safety and environmental regulations in the FSS.

**Table 4.9: Challenges operators of FSS face in their compliance with the environmental health and safety guidelines of fuel service stations**

		YES		NO	
		NO.	%	NO.	%
1	Would uncooperative attitude of some workers make compliance to regulation difficult?	40	80%	10	20%
2	High cost of implementing some environmental health and safety policies presents a challenge in implementing these policies?	44	88%	6	12%
3	Lack of attention to details is a factor in non-compliance with environmental health and safety regulations?	42	84%	8	16%
4	Lack of clear policy on health and safety contributes to non-compliance with environmental health and safety standards?	46	92%	4	8%
5	Can inadequate commitment from top management be a major challenge in ensuring compliance with environmental health and safety standards?	32	64%	18	36%
6	Would overcrowded workers present a hindrance to compliance with environmental health and safety standards?	41	82%	9	18%

**Source: Field work, 2019**

In the area of some workers making compliance to regulation difficult due to their uncooperative attitude, eighty- four percent (84%) responded yes and sixteen percent (16%) said no.

Uncooperative attitude of workers is common, hence, Ogbo (2009) asserts that the job of

management is to develop a safety and health awareness that surrounds every employee on his or her job. This is an indication that when the attitudes of workers in the FSS are not checked and not taken into effect their behaviours relating to compliance to health and safety

regulation there will constant incidents, due to their uncooperative attitudes.

Seventy-eight percent (78%) believed high cost of implementing some environmental health and safety policies presents a challenge in implementing policies but twenty-two percent (22%) declined by responding no. As stated by Ambisizi et al (2014), that lack of enforcement by the OMCs in the downstream sector is due to inadequate funding on the part of the company or regulatory bodies. For instance, in the downstream sector, environmental issues and poor safety operation are due to cost. Again this is in line with Ebigo (2008) that cost intensive brings about the inability to train staffs, necessary facilities and equipment by the OMCs or the regulatory bodies to discharge their functions as needed. As agreed to by the 78% of the respondents, the high cost of implementing environmental health and safety polices then limits the OMCs and the agency's ability to monitor and see to it that in the downstream operators comply to occupational health and safety guidelines,

In relation to lack of attention of details as a factor in non-compliance with environmental health and safety regulations, ninety percent (90%) of the data obtained responded yes and the remaining ten percent (10%) said no. The

high percentage in respondent is an indication that workers' inability in paying attention to details in FSS is a major factor to non-compliance. It is therefore on the OMCs and the regulatory agencies to create an awareness medium which will constants prompts employers.

On the issue of clear policy on health and safety contributing to non-compliance with environmental health and safety standards, twelve percent (12%) of the respondent were not in agreement thereby responded no and the remaining eighty-eight percent (88%) the respondent said yes, that lack of clear policy contribute to non-compliance with environmental health and safety standards. The study outcome shows that without an efficient policy on the health and safety, the willingness of workers to comply with environmental health and safety standards will be negative and then results in environmental hazards, occupational hazards and work incidents. As Yirenkyi (2016) clearly stated, for non-compliance of workers in environmental health and safety standards to be off, management must carefully design policy which focuses on the cure purpose and are detailed on current situation and relevant in the sector.

Respondent responses to can inadequate commitment from top management be a major challenge in ensuring compliance with environmental health and safety standards was eighty-four percent (84%) yes and the remaining sixteen percent (16%) responded no. As Freeman (1982) stated, management role in the affair of the cooperation is very essential and that top management are to take the health and safety of the organization very serious.

The findings affirm to Freeman's (1982) assertion as majority of the respondents agreed that if the commitment from the top management is handicap there will a negative effect on the parts of the workers complying to the environmental health and safety standard and when it does happen like that there will hazards and accidents happenings.

## **5. Conclusion and Recommendations**

### **5.1 Introduction**

This Chapter contains the summary of the findings, the conclusions and the recommendations. It also addresses the main objective of the study; Establish the challenges of compliance with the occupational health and safety guidelines of fuel service stations

### **5.2 Summary of Findings**

In this study, the focus was on assessing the level of compliance with environmental health

and safety procedures in the petroleum downstream sector in the Adentan municipality. The research used frequencies and the percentages to analyze the survey data and was then classify in the frequency table for the analysis of the data.

Findings from this research question; 'What challenges do operators of FSS face in their compliance with the occupational health and safety guidelines of fuel service stations?' speaks of volumes, that operators of FSS faces challenges in their duty in implementing policies on environmental health and safety are due to cost and inadequate commitment from top management in ensuring compliance with environmental health and safety standards. Again, it was clear that some FSS have no clear cut policy on health and safety and workers not showing and paying keenly interest and attention to details are major factors for non-compliance with environmental health and safety regulations.

Finally, negative attitudes 'uncooperative attitudes' (84%) on the part of workers and higher number of workers 'overcrowded workers' (92%) at workplace make it difficult and hinder workers to comply with environmental health and safety regulations and standards.

### 5.3 Conclusion

The conclusions from this study are that; the level of compliance with environmental health and safety procedures in the petroleum downstream sector are;

1. Moreover, it was identified that operators of FSS faces numerous challengers in their core to duty in implementing policies on the environmental health and safety as cost and inadequate commitment from the top management in ensuring compliance with environmental health and safety standards.
2. The finding also showed that non-compliance with environmental health and safety regulations are as a result of;
  - i. Lack of attention to details on the parts of employees and the employer
  - ii. Lack of clear policy on environmental health and safety
3. Finally, uncooperative attitudes and overcrowding at workplace is a difficult challenge creating hindrance to compliance with environmental health and safety regulations and standards.

### 5.4 Recommendations

In addressing the main objective of the study, the result from this study raises some implications to underscore its usefulness.

It also concluded per the finding that cost of implementing policies concerning environmental health and safety is a challenge and workers not given total attention to details contributes to non-compliance with environmental health and safety regulation at the workplace.

It also was seen that lack of clear policy, inadequate commitment from top management are also major factors that contribute to non-compliance with environmental health and safety standards. As Alli (2008) also documented high performance and hazard prevention are ensured when there is management leadership commitment and workers involvement through adequate training for both.

It is recommended that, for compliance with environmental health and safety regulation in the downstream sector to be observe by the OMCs; workers are to be taking through some workshop to help train and develop their attitude positively, operator are to take a critical look into top management commitment, cost of implementing polices and workers who are unable to pay attention to details by developing

a high level and lasting solution for a conducive environment with good health and safety

workplace.

### References

- [1].Alli, B., O. (2008). Fundamental principles of occupational health and safety (2<sup>nd</sup> Ed.) International Labour Office – Geneva:ILO.
- [2].Ambisisi, A., Amezaga, J., Emeseh, E. (2014). Analysis of safety and environmental regulations for downstream petroleum industry operations in Nigeria: problem and prospects. *Environmental development*. 9, 43-60.
- [3].Ambisisi, A. (2016). A risk management framework for downstream petroleum product transportation and distribution in Nigeria. London, Coventry University.  
<http://www.researchgate.net/publication/312498915>.
- [4]. Ambituuni, A., Amezaga, J., Emeseh, E. (2018). Optimising the integrity of safety critical petroleum assets: A project conceptualisation approach. *IEEE Transactions on Engineering Management*. DOI: 10.1109/TEM.2018:2839518.
- [5].Amponsah, R., Opei, F. K. (2014), Ghana's downstream petroleum sector: An assessment of key supply chain challenges and prospects for growth, *Int. Journal of Management and Business Studies*. ISSN 2167-03 Vol 7(3), pp. 441-48.
- [6].Ampofo, K. (2008). Ghanaweb. Retrieved from <http://ghanaweb.com/mobile/wap.small/news.article.php?ID=19014>.
- [7].AGI (2018): Petroleum and the environment: Transportation of oil, gas and refined products, part 15, *AAPG Foundation, 2018 American Geoscience institute*.
- [8].API Energy (2018). Transporting oil and natural gas.
- [9].Baker, S. (1990). Participative approach to safety management in the bauxite-alumina industry. *The Journal of Occupational Health and Safety in Australia and New Zealand*, 6(6), 469-480.
- [10]. Barclays (2015). Environmental and social risk briefing (oil and gas)

Version 6.0 March 2015 Barclays  
Bank PLC

- [11]. Boateng, J. K., Buahing, A. A. (2014). Assessing educational needs of workers on effective health, safety, environment and quality (HSEQ) management system in Ghana's oil retail industry. *European Journal of Business and Management, Vol. No. 20, ISSN 2222- 1905.*
- [12]. Charles, C., (1999). The petroleum industry: A nontechnical guide, Tulsa: Penn well, constitution of the federal republic of Nigeria, 1999 (hereafter CFRN). Section 20, 12, 33 and 34.
- [13]. DIR (1997). Diesel transport, storage and refueling underground. guidelines, Documents No. ZMA565BN.
- [14]. Dordi, H. (2009). Health, safety and environment culture in the petroleum industry in Norway. Dissertation for the degree philosophiae doctor (PhD) University of Bergen, Norway.
- [15]. Ebigo, P. O. (2008). Appraising the impact of economic reform programme on micro, small and a. medium scales enterprises. A paper delivered at the 19th Enugu international trade fair colloquium. Enugu, Nigeria.
- [16]. Freeman, R.E. (1984). Strategic management, a stakeholder approach. Boston: Harper Collins.
- [17]. Ghana Exploration and Production Forum (2013). Retrieved from:  
a. <http://gh-epf.org/index.php/about-the-industry>.
- [18]. Hanlon, B. & Larget, B (2011). Samples and populations. Department of Statistics, University of Wisconsin – Madison September 8, 2011.
- [19]. HSE (Health and Safety Executive) (2000). Successful health and safety management, HMSO, London.
- [20]. HSS (2016). Safety Note 71: transportation, storage and use of petroleum. University of Reading 2016, Edition1, March 2016.
- [21]. Huang, L. J & Liang, D. (2013). Development of safety regulation and management system in energy industry of China: comparative and case study perspective. *Procedia Engineering, 52(0), pp.165 – 170.*



- [22]. ILO (2003). Safety in numbers: pointers for a global safety culture at work. Geneva, Switzerland.
- [23]. ILO (2013). Safe work. Global estimates of fatal work related diseases and occupational accidents, World Bank Regions.
- [24]. Jilcha, K., Kitaw, D. (2016). A literature review on global occupational safety and health practice & accidents severity. *International Journal for Quality Research* 10(2) 279-310 DOI- 10.1821/IJQR 10.02-04. ISSN 1800-6450.
- [25]. Kahn, W. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal* 33(4), 692 – 724.
- [26]. Kamau, O., & Sma, M. (2016). A critical review of literature on employee engagement concept, *IJRSS*, Vol 6 No: 3 ISSN 2307 – 227X.
- [27]. Kanyi, J. (2014). Factors affecting environmental best practices compliance among retail fuel service stations in Thika East Sub – Country Kenya. University of Nairobi. Thesis
- [28]. Kelloway, E. & Day, A. (2005). Building healthy workplaces: What we know so far. *Canadian Journal of Behavioural Sciences* (37) 223-235.
- [29]. Karr, A. (2000). They're falling. *Safety and Health*; 161(1), 30 – 35
- [30]. Lewin, G. (2003). Managing the downstream oil supply chain: A customer-led strategy. *World Energy*, vol: 22-25.
- [31]. Maslach, C., Leitei, M., P. & Scheufeh, W., B. (2001). Job bournout. *Annual Review of Psychology*, 52(1), 397 – 422.
- [32]. Mishra, S. & Sahoo, C., K. (2012). A framework towards employee. The PSU Experience [Article]. *ASCI Journal of Management*, 42(1) 94 – 122.
- [33]. MOWLAP (2002). A field guide to fuel handling, transportation and storage (3<sup>rd</sup> Ed. Feb, 2002). British Columbia.
- [34]. National Petroleum Authority Act (2005). Retrieved from Parliament of Ghana: <http://www.parliament.gh/assets/file/Acts/ACT%20691%20National%20Petroleum%20Authority.pdf>.
- [35]. Niven, K. & Mcleod, R (2009). Offshore industry; management of health hazards in the upstream petroleum industry. Oxford, *Oxford University*

- Press.* *Journals.*  
[permissions@oxfordjournal.org](mailto:permissions@oxfordjournal.org)
- [36]. NPA (2017). 21 fuel stations shutdown for failing to meet regulatory standards-NPA, Sat, 14<sup>th</sup> Oct, 2017, General News.
- [37]. Ogbo, A. (2009). Occupational safety and management adherence for sustainable development in Nigeria. *Journal of Nigerian Institute of Management*, 44, 14-19.
- [38]. Ologbo, C. A. & Saundah, S. (2011). Engaging people who drive execution and organizational performance. *American Journal of Economic and Business Administration*. 3(3) 569 – 575.
- [39]. Oluwagbemi B., F. (2011). Themes and issues in occupational health and safety, 2nd edition, vertex media limited, Ibadan, Nigeria pp 19. Ontario Ministry of Labour.  
<https://www.labour.gov.on.ca/english/hs/faqs/hazards.php>.
- [40]. Omar, A., A., H. (2016). Employee engagement: A review of the recent empirical literature, University of Khartoum, Sudan, *IJARIE – ISSN (0) – 2395 – 4396, Vol – 2 Issue 6*.
- [41]. Parker, D. L, Carl, W. R., French, L. R., & Martin, F. B. (1994). Characteristics of adolescent work injuries reported to the Minnesota department of labor and industry, *American Journal of Public Health*, 84(4), 606 - 611
- [42]. Petroleum Regulations (2017). Exploration and production (Health, Safety and Environment). L.I. 2258. Ghana Publishing Company, Assembly Press, Accra.
- [43]. Petroleum Industry, Wikipedia. (2013). Retrieved from Wikipedia: [http://en.wikipedia.org/wiki/Petroleum\\_industry](http://en.wikipedia.org/wiki/Petroleum_industry).
- [44]. Principle II Rio de Janeiro, (1992). Report of the United Nations Conference on Environment and Development. Rio Declaration on Environment and Development. 3-14 June 1992.
- [45]. Quartey, S.H. & Pupilampu, B., B. (2012). Employee health and safety practices: an exploratory and comparative study of the shipping and manufacturing industries in Ghana. *International Journal of Business and Management*, 7(81).  
<http://dx.doi.org/10.5539/ijbm.v7n23p81>.

- [46]. Rowe, H. (2001). Best practice in health and safety through staff involvement. *Conference Papers Safety in Action 2001*. Melbourne: Safety Institute of Australia.
- [47]. STI Group (2018). Pipeline, ship and rail: The benefits and needs of difficult oil and gas transport methods, 3127, Taxes Ave/Bridge City.
- [48]. Tullow Oil Ghana (2013). Tullow Oil Ghana. Retrieved <http://www.tulloil.com/ghana/index.asp> (2013, October)..
- [49]. WHO (2010). Raising awareness of stress at work in developing countries protecting workers' health series 6; Geneva, Switzerland. WHO Press
- [50]. WHO (2010). WHO healthy workplace, framework and model, background and supporting literature and practices. Retrieved from <http://www.who.int/occupationalhealth/healthy.workplace/en/index.html>
- [51]. Yirenkyi, G. (2016). Occupational health and safety audit of fuel filling stations in the Agona Nkwanta Inhaban and Secondi – Takoradi Metropolis in Ghana, A thesis presented to knust, Kumasi, Ghana. Thesis
- [52]. Zafar, A. (2014). Health and safety in oil and gas sector, Bureau Varistas, Pakistan.