

**BENCHMARKING HEALTH, SAFETY AND ENVIRONMENTAL (HSE)  
PERFORMANCE MEASUREMENT PRACTICES IN THE OIL  
INDUSTRY IN KENYA** 11/11/2007

Submitted as the University Supervisor  
Date: 22/4/07

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**This Management Research Project was Submitted in Partial Fulfillment of the  
Requirements for the Award of the Degree of Master of Business Administration  
(MBA), the School of Business, University of Nairobi.**

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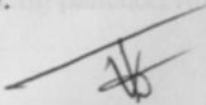
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## DECLARATION

This Project is my original work and has not been submitted for a degree in any other University.




21/11/2007

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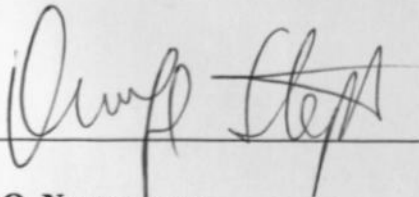
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## DEDICATION

This study is dedicated to my daughters Chelimo and Chepkorir, and to my entire family for their enduring patience, love, encouragement and support.

## ACKNOWLEDGEMENT

I acknowledge the contribution of the following people whose inputs, guidance, support, supervision, encouragement and determination facilitated the completion of this project: my supervisors Mr. J.K Kenduiwo and Mr. S.O. Nyamwange, all the MBA lecturers and my MBA colleagues, especially at KPRL.

Descriptive survey was used in this research study. The sample for the study was selected from the population through the convenience sampling technique and primary data was collected through a structured questionnaire. Content analysis was used to analyze the data collected.

The study revealed that Kenyan oil companies measured their health, safety and environmental performance using varied performance measurement indicators. The study also revealed few Kenyan oil companies benchmarked their health, safety and environmental performance measurement practices, with a significant proportion concentrating on internal benchmarking. Finally, oil companies in Kenya encountered many challenges when carrying out such benchmarking studies. These include the unwillingness to share information among competing partners, lack of top management commitment, low priority given to the HSE function within company and lack of resources.

The study concluded that benchmarking was a powerful tool for continuous improvement that helped to measure and compare results, highlight gaps in performance and identify the potential for improvement in order to achieve superior performance. Kenyan oil companies needed to benchmark their health, safety and environmental performance measurement practices for continuous improvement. In addition, health, safety and environmental performance measurement was a growing corporate social responsibility and a core business value that should not be compromised for monetary gains. Finally, a balanced scorecard of measures rather than a single measure provided better information on a range of health, safety and environmental performance measurement activities in the Kenyan oil industry.

## ABSTRACT

The management of Health, Safety and Environment (HSE) is a critical function in the Kenyan oil industry, both from the statutory compliance perspective and from the point of view of corporate responsibility and risk management. This study therefore sought to identify the key indicators used in measuring Health, Safety and Environmental (HSE) performance by the Kenyan oil industry, to establish whether Kenyan oil companies benchmarked their HSE performance measurement practices and to critically examine the challenges faced while undertaking these benchmarking programs. ....5

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## CHAPTER 1 : INTRODUCTION

### 1.1 Background

#### 1.1.1 Benchmarking

As the pace of change accelerates in the 21<sup>st</sup> century as a result of technological opportunities, liberalization of world markets, globalization, increased quality requirements from customers and demand for innovation, organizations have had to adjust and realign their operations (Yassar, 2001). Yassar further observed that this pace of change has increasingly forced organizations to be more outward looking, market oriented and knowledge driven. Competitive pressures have forced organizations to increase their productivity and competitiveness in order to survive and prosper. In other words, organizations are undergoing changes in their operations to evolve, survive and compete in their respective environments.

Amolo (2002) however observed that all operations, no matter how well managed, were capable of improvement. The urgency, direction and priorities of improvement will be determined partly by whether the current performance of an operation is judged to be good, bad or indifferent. All operations therefore need some kind of performance standard as a pre-requisite for improvement. This is precisely what benchmarking does.

Camp (1989) defined benchmarking as the search for industry best practices that lead to superior performance. This definition is broad enough to accommodate all levels or types of practices to benchmark. Benchmarking can work in all possible areas of products, services and related process across different national or business boundaries.

As a management tool and technique for continuous improvement, benchmarking has proved to be valuable in helping individual companies evaluate their competitive position relative to their competitors, develop strong capabilities, ensure an inward flow of ideas and establish true competitive gaps. Guillard (2002) observed that benchmarking helps to measure and compare business results, highlight gaps in performance, identify the potential for improvement and change the way business is conducted, in order to achieve superior performance. Benchmarking produces benchmarks, which are standards, or reference points.



Performance improvement is the key driver behind benchmarking, as it offers the only real justification to make available the resources necessary for a complete benchmarking and improvement program. Improvement in performance yield benefits such as better occupational health, safety and environmental performance, and also, higher reliability, increased asset utilization, improved production, higher productivity, lower operation costs, enhanced business focus and a more effective organization (Guillard, 2002).

### **1.1.2 The Oil industry in Kenya**

The oil industry in Kenya was well established by the time Kenya gained its independence in 1963. At least two multinational oil companies operated in Kenya by 1930. For many years after independence, the industry was controlled by six multinational oil companies, namely Shell/BP, ESSO, Mobil, Total, Agip and Caltex (Isaboke, 2001). The industry was vertically integrated, with oil companies controlling the supplies from the oil well, shipping, inland distribution and retailing. These companies imported crude oil which was processed at the Kenya Petroleum Refineries, accounting for over 85% of the inland product sales. In the period 1963 to 1974, the industry was regulated on the basis of the white oil rule, which was meant to offer protection to the Kenya Petroleum Refineries (KPRL). In 1971, the Government of Kenya acquired 50% of the equity in the refinery and in 1977; the Government built an oil pipeline connecting Mombasa and Nairobi and at the same time oversaw the formation of the Kenya Pipeline Company (KPC) to manage the pipeline system (Chepkwony, 2002).

The Kenyan oil industry has experienced several changes in the last few decades. Increased competition due to economic liberalization and globalization has resulted in consumers having more choices and being more demanding (Amolo, 2002). Prior to 1994, the oil industry in Kenya was a regulated sector, mainly dominated by multinationals. The government, through NOCK, controlled retail prices, transportation cost, importation and refining of products. In 1994, the industry was liberalized, thus allowing the industry players to set their own rules of operations. Since then, the industry has become very competitive. After liberalization of the industry, a few independent oil companies entered the industry. However, it was not until 2001 when the crude oil and product prices collapsed that a rush of independent companies started operating in the country (Chepkwony, 2002).

Competition in the petroleum industry in Kenya is conducted at three levels: Procurement (firms importing refined or crude oil), Distribution (firms distributing the refined products to retail outlets or to industrial users) and Retailing (firms that have retail outlets such as petrol stations, and sell directly to consumers) (Murage, 2001). By the end of August, 2007, there were 38 oil marketing companies licensed by the Ministry of Energy (MOE) to import and process petroleum products in Kenya (Appendix III).

With the entrance of the Independent Petroleum Dealers into the market, the ever changing customer requirements, and the legal requirements for compliance to health, safety and environmental (HSE) standards, oil marketing companies in Kenya are facing stiff competition to improve their operations and expand their market share (Murage,2001).

### **1.1.3 Health, Safety and Environmental and the Oil Industry**

Occupational health refers to the general state of the physical, mental and emotional well-being of employees at the work place (Mathias et.al, 1994). On the other hand, occupational safety is concerned with an accident free working environment, with focus being to identify, investigate, control and eliminate risks and hazards which causes accidents (Armstrong, 1977). The Environment includes the physical factors of the surroundings of human beings, including land, water, atmosphere, climate, sound, odour, taste, the biological factors of animal plants and the social factor of aesthetics (The Environmental Management and Coordination Act, 1999).

Every single disaster, accident or mishap is just not ruinous to a company, per se, but also stakes the welfare of the society at large and hence implementation and responsible adherence to Health, Safety and Environment (HSE) practices plays a vital preventive role (Health and Safety Executive, 2006). Kenei (1995) further observed that accidents and ill health were costly to the workers and their families. In addition to costs of personal injuries, companies may incur far much more costs from damage to property and in lost production.

Globally, several catastrophic incidents related to health, safety and environmental issues have occurred within the oil industry. The Mexico City LPG Distribution Center Explosion of 1984 resulted into 542 fatalities and 7000 injuries (Wells,1997).An explosion and subsequent fire on Piper Alpha Oil Rig in the United Kingdom resulted into the death of 167

oil workers on 16<sup>th</sup> July 1988 (Wells, 1997). In 1989, the Exxon Valdez oil tanker spilled 11 million gallons of crude oil in Alaska. In March 23, 2005, the BP Texas City Refinery experienced a catastrophic process accident that resulted in 15 deaths and more than 170 injuries (The B.P US Refineries Independent Safety Review Panel, 2007).

In Kenya, several accidents related to the oil industry have been experienced. In the 19<sup>th</sup> of August 2000, at least 25 people burnt to death after a goods train carrying Liquefied Petroleum Gas (LPG) rolled back, hit stationary wagons and exploded in the process. On 12<sup>th</sup> April 2005, an Indian oil tanker, MT Ratna Shallini spilled 140 metric tons of crude oil in Mombasa harbour. The tanker hit metal railings as it docked, puncturing the hull and creating a slick with a radius of two kilometers (British Broadcasting Corporation, 2007). Several accidents involving road tankers transporting petroleum products have also been witnessed in Kenya, with most resulting in fatalities.

Oil companies therefore recognize the far-reaching effects that health, safety and environmental (HSE) issues can have on their business. They believe that long-term competitive success depends on being trusted to meet the expectations of society as well as those of shareholders and stakeholders. This is achieved by developing ideas and implementing technologies that help to improve margins and live up to social and environmental responsibilities (Guillard, 2002).

In addition, the increasing public awareness of and the ever more stringent legislation on health, safety and environmental issues have put unprecedented pressure on today's business operations. There is therefore a constant need to not only maintain a global reputation but at the same time promote growth in the company's bottom line. Health, safety and environmental performance is a growing corporate social responsibility for oil firms and it is indeed a true reflection of a company's values and vision for future (Guillard, 2002).

The management of Health, Safety and Environment (HSE) is a therefore critical function in the Kenyan oil industry. This is very important both from the statutory compliance perspective and from the point of view of corporate responsibility and risk management. Because of the risks involved in the oil industry, oil companies have to manage the risks and consequences of catastrophic Health, Safety, and Environmental incidents.

Several studies relating to the practice of benchmarking in the oil industry as well as to health, safety and environment have been carried out. Mberia (2001) surveyed the occupational health and safety programs adopted by the banking industry in Kenya. Her studies concluded that the service sector recognized health and safety issues at the workplace, and that health and safety issues were not confined to the manufacturing sector alone. Amollo (2002) looked at benchmarking of the order delivery process for continuous improvement in the Kenyan oil industry and found out that Kenyan companies did not systematically use benchmarking as a tool for continuous improvement, mainly because they faced serious obstacles when obtaining benchmarking information from other firms. Nyamwange (2001) addressed the operational strategies used by large Kenyan manufacturers. Murage (2001) looked into the competitive strategies adopted by members of KIPEDA (Kenya Independent Petroleum Dealers Association). Amolo (2002) in his suggestions for further research stated that benchmarking is a continuous improvement tool and is applicable to all industries. In addition, Amolo observed that benchmarking is not widely used as a tool for continuous improvement in the Kenyan oil industry. The study recommended that there was need to benchmark against best practices for firms operating in the same environment.

## **1.2 Problem Statement**

A large part of the available knowledge on Health, Safety and Environment (HSE) cannot directly be exploited. It needs to be transformed into a set of performance targets, and a method to reach the set targets. This is precisely what benchmarking does. Performance improvement is the key driver behind benchmarking, as it offers the only real justification to make available the necessary resources for the program (Guillard, 2002).

One of the major difficulties many organizations faced when wanting to make use of published statistics about Health, Safety and Environment (HSE) was that definitions often differed between data sets, and between organizations and their local or national authority. Even when definitions varied only slightly, gathering compatible and meaningful information became a difficult task. In addition, it was difficult to assess whether the information gathered is truly applicable to a specific kind of business.

The Kenyan oil industry was composed of many players at varied levels of the importation, refining, distribution and retailing. Amolo (2002) observed that most of these oil companies in Kenya were foreign-owned; they had different operating standards set by their parent companies. And in cases where the government had set health, safety and environmental legislations, these companies used different processes to comply with the standards. Muchai (1999) further observed that among the new entrants to the Kenyan oil industry were firms owned by Kenyan investors, commonly referred to as the Independent Petroleum Dealers (IPD's). Unlike the owners of petroleum outlets, these firms were not contractually bound to distribute and retail only the exclusive products of a particular supplier or distributor.

Most firms in Kenya did not adhere to any specific health, safety and environmental performance standards, except when complying with statutory requirements which are often poorly enforced by the relevant government agencies, notably the Directorate of Occupational Health and Safety (DOHSS) and the National Environmental Management Authority (NEMA). In such cases, their health, safety and environmental practices are barely minimal and certainly not yet best practice. So how then can Health, Safety and Environmental (HSE) practices be improved within the Kenyan oil industry?

This research study therefore focused on the use of benchmarking to improve health, safety and environmental performance measurement practices among all the players in the Kenyan oil companies. The study sought to answer the following research questions:

1. What key indicators in Health, Safety and Environmental (HSE) performance measurement are used by Kenyan oil companies?
2. Do Kenyan oil companies benchmark their Health, Safety and Environmental (HSE) performance measurement practices?
3. What challenges do oil companies in Kenya face while undertaking benchmarking programs in Health, Safety and Environmental (HSE) practices?

### **1.3 Objectives of the Research Study**

The objectives of the project were to:

1. Identify the key indicators used in measuring Health, Safety and Environmental (HSE) performance by Kenyan oil companies.
2. Establish whether Kenyan oil companies benchmarked their Health, Safety and Environmental (HSE) performance measurement practices.

3. Examine the challenges faced by oil companies in Kenya while undertaking benchmarking programs in Health, Safety and Environment (HSE).

## 2.1 Benchmarking

### 1.4 Importance of the Research Study

The study will help Kenyan oil companies to assess their level of HSE performance in relation to their peers and other industry players. By gaining an external perspective on their performance, they will be able to review their business direction, set challenging targets and identify new areas where improvements can still be realized.

The study will also assist HSE managers to evaluate local conditions, key success factors and challenges unique to the Kenyan business environment that contribute to the successful implementation of benchmarking as an HSE performance improvement tool. This will in turn avoid blind imitations that are often costly and time wasting.

The knowledge and information from this study will be used by Kenyan companies in utilizing the concept and tool of benchmarking to improve performance with respect to other businesses elements, cost drivers as well as margin enablers by approaching benchmarking as a means to an end, and not an end in itself.

- a) Value of learning from contexts outside one organization's usual frame of reference
- b) Importance of understanding this learning using a structural, formal approach
- c) Comparison of practices between oneself and best-in-class on a continuous basis
- d) Usefulness of information to drive actions to performance improvement.

This definition however critically ignores the possibility of comparison with internal process. Furthermore, it does not include the concept of searching which emphasizes every possible means to look for the best practices, and the concept of superior performance which sets the target higher than only improved performance. A working definition of benchmarking should be as simple as possible as well as clear enough (Vaziri, 1992). The purpose is to let those whose work is based on it know what they should do and how they could achieve these targets.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 Benchmarking

#### 2.1.1 Overview of Benchmarking

Camp (1989) defined benchmarking as the search for industry best practices that leads to superior performance. Beadle (1995) observed that benchmarking was a technique or tool for performance improvement, good quality practices and striving to be the best. The Design Committee of the International Benchmarking Clearing House in the US developed another definition that attracted more than 100 companies to adopt. It referred to Benchmarking as *a systematic and continuous measurement process, a process of continuously measuring and comparing an organization's business processes against business leaders any where in the world to gain information which will help the organization to take action to improve its performance* (Watson,1993).

Many authors have attempted to define benchmarking. They, however, do not all view it with the same meaning. Each meaning has its usefulness in defining benchmarking. This view offers more detail to embrace the generic nature of benchmarking in four essential themes (Fong, et.al. ,1998):

- a) Value of learning from contexts outside on organization usual frame of reference
- b) Importance's of understanding this learning using a structured, formal approach
- c) Comparison of practices between oneself and best –in- class on a continuous basis
- d) Usefulness of information to drive actions to performance improvement.

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At the core of successful benchmarking lies a regular and documented world wide scan for organization's that are skilled at what they do regardless of industry . These organizations are then visited with the aim of gaining better understanding of the process and ways of working. The findings are then used to stretch the imagination and develop new goals (Garvin, 1991). Thus, benchmarking is both a means by which new practices are discovered and understood, as well as a goal setting process (Camp, 1989).

2.1.1.3. Communication findings and gaining acceptance and establishing

### 2.1.2 Why Benchmark?

There are various reasons why organizations embark on benchmarking (Guillard, 2002). The industry leaders, however, benchmark their operation regularly for some of the following reasons. Firstly, organizations benchmark their operation to ensure that they know at what level they are performing, and how their performance compared to peer organizations. Secondly, organizations benchmark their operation to be aware of trends in industry, in order to assist them in selecting or reviewing business direction, and setting challenging targets. Thirdly, organizations benchmark their operation to gain an external perspective on their performance and identify what new improvements can still be realized. Finally, organizations benchmark their operation to gather evidence from meaningful comparisons to prevent or cure denial syndrome (Guillard, 2002)

Success Factors

Performance improvement is the key driver behind benchmarking, as it offers the only real justification to make available the resources necessary for a complete benchmarking and improvement program. Guillard (2002) noted that improvements in performance yield benefits such as better occupational health, safety and environmental performance, higher reliability and increased asset utilization, improved production, higher productivity and lower operating costs as well as enhanced business focus with a more effective organization.

2.1.3.1 Metrics benchmarking

### 2.1.3 Benchmark Models

Various benchmarking models have been developed. Watson (1993) observed that some authors have modeled the benchmarking process on the basis of the Deming cycle. These models have a different number of phases, ranging from four steps to even thirty. Camp (1989) suggested a ten-step generic process for benchmarking.



Fong, et.al (1998) further observed that the modified model adopted from Vaziri (1992) and Camp (1989) had five phases.

- a) Planning phase - Identifying what is to be benchmarked, identifying the best performers for comparison, determining the data collection method and collecting.
- b) Analysis phase - Determining the current performance gap and projecting future performance levels.
- c) Integration phase -Communication findings and gaining acceptance and establishing functional goals.
- d) Action Phase – Developing action plans, implementing actions ,monitoring progress and recalibrating benchmarks
- e) Maturity phase- Answering the following questions: whether the practices are fully integrated into the process and whether the organization has attained a leadership position.

Fong, et.al (1992) summarized the model into the following simplified steps:

1. Establish a benchmark team which is cross-functional
2. Identify specific areas to benchmark
3. Search for benchmark partners and determine performance measures for the critical success factors.
4. Consider feasibility of the benchmark practice in terms of technology, resources and organization structure.
5. Compare own performance with benchmark partner
6. Implement gaps identified.

Guillard (2002), however, proposed a benchmarking model that involves the following steps:

### **2.1.3.1 Metrics benchmarking**

In the assessment phase, data are collected, validated and used to calculate performance indicators. These are compared to similar results from other participants in the benchmarking review. Specific benchmarks can be derived, and performance gaps calculated against these benchmarks. This first stage is known as metrics benchmarking, as the comparisons are based on quantitative approach, using performance indicators, or metrics.

### **2.1.3.2 Gap analysis**

During the second stage, potential for improvement is evaluated. This potential depends on the performance gaps calculated in step 1, but also on the vision and objectives of the business and on the local conditions including the social-economic factors which influence business performance. The performance needs to be fully analyzed and understood, taking into account all the factors which have an impact on the business results. This activity constitutes the analysis phase where the benchmarks and the performance gaps are used as starting points to set meaningful business targets.

### **2.1.3.3 Action plan**

A program needs to be set to map progress from the present of performance to the desired level, as quantified through the business targets. This stage focuses on business processes and practices. It examines how the better performers have achieved and sustained their position, and how their practices can be adapted to assist in improving business performance.

### **2.1.3.4 Implementation**

During this step, existing business processes and practices need to be reviewed and modified, using the experience gained in the previous stage when practices applied by the better performers were studied. This phase can be driven internally using an in-house team, or externally via consultants. Both methods have been used successfully, but have also resulted in failures on other occasions. There is no single or simple recipe for an effective implementation, but implementation is the key to performance improvement. Unless this step is successfully completed, the whole process will deliver nothing.

### **2.1.3.5 Progress review**

In this stage, actual achievements are compared to the improvement plan and to the targets which were set. During this review, the targets themselves often need readjusting as the world has not remained still whilst changes were implemented. The best way is to start again with step one reassesses the situation, using metrics benchmarking.

Benchmarking should therefore be considered as a continuous process, and not a once-off exercise. In today competitive environment, standing still is equivalent to moving backwards, and failing to ensure that progress is fast enough may result in severe business consequences.

#### **2.1.4 Types of Benchmarking**

Fong, et.al (1998) observed that many authors have developed various typologies assisting in identifying sources of the best practices. Unfortunately, there is still a lack of consciousness about the classification of benchmarking, with each classification having its own pros and cons. Guillard (2002) observed that before embarking on a benchmarking program, however, the business case must be clearly established and several issues need to be carefully considered and suitably resolved. The main issues of concern are the type of benchmarking, the cost of program, the resources required and the impact of the program on the business and organization. The following types of benchmarking are summarized based on Cartin (2002) and Nahamias (2000).

##### **2.1.4.1 Problem-based Benchmarking**

This type of benchmarking is used a tool to solve specific problems proving difficult to solve by other improvement techniques, thus providing not only a solution, but also a major improvement.

##### **2.1.4.2 Product Benchmarking**

This is the practice of tearing down a competitor's product to see what can be learned from its design and construction.

##### **2.1.4.3 Functional Benchmarking**

This focuses on the process rather than the product. This is only possible when companies are willing to cooperate and share information. It applies to process benchmarking on the comparison of particular business functions among two or more organizations.

##### **2.1.4.4 Best Practice Benchmarking**

This is similar to functional benchmarking, except it that focuses on management practice rather than on specific processes, such as work environment or salary.

##### **2.1.4.5 Strategic Benchmarking**

This considers the results of other benchmarking practices in the light of the strategic focus of the firm, i.e. the overall business strategy in relation to results of the benchmarking study.

It involves the assessment of the organization's strategies, such as long-term infrastructure, rather than key operations. (2002)

## **2.1.5 Approaches to Benchmarking**

Benchmarking can be performed through various approaches

### **2.1.5.1 Internal benchmarking**

Camp (1989) noted that it is a measure of single business unit or process compared with other similar units or processes inside the organization. This approach eliminates the need to overcome barriers between strangers especially when it appears competitive advantage will not be compromised.

Guillard (2002) observed that internal benchmarking is relatively simple to set up and organize, as it only involves participants from a single company. It is currently conducted, in one way or another, by many large international corporations to compare the performance of their various operations and divisions. In this type of benchmarking, it is fairly easy to obtain the input necessary for the metrics, as the information systems used by the participants are often the same. Data quality is generally good, as the definitions and instructions used for data collection are understood in a similar manner by all. Comparisons of results are truly and the studies are conducted in an open manner which makes learning points simple to obtain and analyze.

Internal benchmarking can be very rewarding, as the efforts tend to be small compared to other types of benchmarking. After several years of internal benchmarking, however, the benefits become too small, and the company should progress to peer benchmarking to get a wider perspective.

### **2.1.5.2 Peer or Competitor Benchmarking**

Peer benchmarking implies sharing information with other organizations which are often competitors. This process is limited by commercial and legal considerations, and commercially sensitive information should never be included in a benchmarking review. The *Benchmarking Code of Conduct* offers guidance regarding areas where information

exchange is to be avoided, and also advise on ways and means to engage ethically in this type of benchmarking (Guillard, 2002).

For confidentiality and legal reasons, peer benchmarking is often conducted through consultants who facilitate the data collection and analysis, and the comparisons of the metrics. A good benchmarking guideline is to request only as much from others one is prepared to offer in return. The main advantage of peer benchmarking over internal benchmarking lies in comparisons with other companies. The number of participants is usually higher than in internal benchmarking, and the participating companies possess different cultures. The range of performance is therefore likely to be wider, and the practices underlying performance more varied. The main challenge is to figure out how these practices can be adapted to improve business performance (Guillard, 2002).

### **2.1.5.3 External Benchmarking**

This kind of benchmarking is conducted between companies which operate in different business, but face similar issues and employ the same types of business practices and process. It is potentially the most rewarding type of benchmarking, as different businesses normally have dissimilar cultures and practices. Performance breakthroughs are more likely to result from external benchmarking than from any other form of benchmarking (Guillard, 2002).

External benchmarking is, however, the most difficult form of benchmarking.

The usual first stages of metrics comparisons and gap analysis are not really applicable in this case. This is due to the different nature of businesses, making it practically impossible to develop meaningful quantitative performance comparisons.

### **2.1.7 Challenges in Benchmarking**

In general, external benchmarking will focus on a single business process and will target one or two companies which are recognized as leaders in the field. The key is to find and select meaningful benchmarking partners, and then convince them that an external benchmarking program will also be beneficial to them. External consultants are often able to pre-select potential benchmarking partners, and act as intermediaries through the entire program (Guillard, 2002).

### **2.1.6 Costs, Resources and Benefits in Benchmarking**

The cost and the resources required to bring a benchmarking program to a satisfactory conclusion are often underestimated, especially with regards to the implementation phase. It is relatively easy to budget for internal metrics benchmarking, as this phase is of relatively short duration. Once the results of the review have been analyzed, they need to be exploited and this is when allocation of resources usually conflicts with other business priorities. It is, however, imperative to dedicate sufficient of the proper caliber, to plan and drive the implementation of the improvement process, as this is the step which delivers the benefits, and brings value to the organization (Guillard, 2002).

In general, cost and resources requirements will increase from “internal” to “peer” to “external” benchmarking, and so will the overall duration of the program. The increase is mainly related to factors such as the ease of access to data and information, and the compatibility of data, the confidentiality and legal issues and, above all, the size of the performance gap, and the means selected to bridge it. Making use of external resources, such as consultants, often reduces the duration of the program, and may also have a positive impact on cost and resources, especially for organizations which are new to benchmarking (Guillard, 2002).

The costs, resource requirements and benefits of a benchmarking program move in the same direction: greater the potential reward, the higher the effort to get there. It is therefore advisable not to rush into any program but to consider it in the light of the company business objectives and priorities, the availability of resources, the resilience of the organization, its appetite for improvement, its capacity to absorb new ideas and its drive to implement change (Guillard, 2002).

### **2.1.7 Challenges in Benchmarking**

There are several practical challenges to the application of benchmarking as a tool for continuous improvement in many organizations.

Benchmarking is a change agent, requiring a proper implementation strategy. On one hand, change represents growth, opportunity and innovation; on the other hand, it represents threat, disorientation and upheaval. Benchmarking therefore requires time, senior management commitment and resources. It has to link in very closely to the desired strategic goals and

critical success factors (CSF). Moreover, it takes a long-term focus, since culture change is time dependent. It can only succeed in organizations which are committed to continuous improvement (Vaziri, 1992).

The primary weakness of benchmarking however is the fact that the best in class performance is a moving target. For functions that are critical to the business mission; organizations must continue to innovate as well as imitate. Imitation in benchmarking stifles innovation. Organization need to innovate in order to get ahead of competitors (Prabir, 1996).

The high rates of redundancy and obsolescence in management concepts and technological innovations implies that organizations must continuously be outward looking so that they do not waste resources on benchmarking items that become redundant very quickly. This implies a careful selection criterion on what to benchmark (Zairi, 1994).

While benchmarking helps keep track of what is happening and provide a platform to all, the only way to the top is painstakingly developing state-of-the-art competencies in core business areas. This is the most serious short coming of benchmarking method as a strategic competitive tool (Camp, 1989).

Benchmarking is not a strategy or philosophy. It's an improvement tool. To be effective, it must be used properly. It is not very helpful when used in for processes that do not offer much opportunity for improvement. Some processes may have to be benchmarked repeatedly (Vaziri, 1992).

Benchmarking is not a substitute for innovation. However, it is a source of ideas from outside from outside the organization. Business success depends on setting and achieving the goals and objectives based on external reality. Consumers don't care if a process achieved a 20% year to year productivity gain; they care about quality, cost and delivery, and they vote with their checkbooks for the superior organization (Besterfield, 2006).

Despite the benefits of benchmarking, the methodology is essentially reactive in nature. Almost, always, firms have adopted benchmarking process as a way to catch up in a competitive market place. Xerox's successful use of benchmarking to re-engineer its costs

resulted in cost reduction, improved quality and better customer satisfaction. An important fact that was often overlooked was the failure of Xerox to regain its lost market share (Camp, 1989).

Although the goal of benchmarking is often to achieve customer satisfactions, it is the lure of cost reduction that persuades top management to dedicate resources to a benchmarking study. Thus, benchmarking and the resultant process re-engineering have simply become efforts to catch-up rather than to get out in front (Vaziri, 1992).

It has been observed that while benchmarking may help a firm to become more cost effective, its role as a long- term strategic initiative is at best, limited .Catching up is a necessary but it is not to turn an “also- ran” into a leader. The only way to obtain leadership is by constantly redefining the industry and redrawing boundaries. There was no such thing as “sustainable” leadership; it must be regained again and again by innovation and looking beyond the familiar paths (Prabir, 1996).

Besterfield, et.al (2006) observed several other limitations of using benchmarking as a continuous improvement tool. There is over-reliance on quantitative data (metrics). Consequently, there is a misunderstanding of the underlying reasons for the performance measures to strategic competencies and key processes. By focusing on numbers companies sometimes focus on data and not on the processes used to produce the data. Data can also be manipulated.

Losing focus on customers and employees occurs. Because of limited resources for the benchmarking it often involves a high degree of self-evaluation, which may cause some organizations to lose focus on customers. Similarly, companies that try to produce better benchmarking results could quickly cause employee burn-out and an escalation in errors.

There is difficulty in obtaining useful information about competitors. Competitors may be uncooperative. In addition, gathering competitive intelligence requires considerable time, effort, and money. Furthermore, there can be ethical and legal questions about some intelligence activities, such as paying a competitor’s employees for information and recording conversations.



There is difficulty in benchmarking services. Even though service operations can be broken down into their components it is more difficult to benchmark service operations than to benchmark products. Services often involve skills and other tacit factors that are difficult to quantify. In addition, there is often a narrow scope of companies studied, resulting from the failure to expand the scope of companies studied. It may be relevant to benchmark against companies outside the user company's industry (process benchmarking).

There are cultural difficulties in transferring "best practices" in multinational firms due to differences in behavioral and cultural background of the organizational members in the foreign subsidiaries of the firm.

## **2.2 Health, Safety and Environment (HSE)**

### **2.2.1 Overview**

Most companies recognize the far-reaching effects that health, safety and environmental (HSE) issues can have on their business. They believe that long-term competitive success depends on being trusted to meet the expectations of society as well as those of shareholders and stakeholders. This is achieved by developing ideas and implementing technologies that help to improve margins and live up to social and environmental responsibilities (Guillard, 2002).

Health, Safety and Environment (HSE) is a core business value that should not be compromised for monetary gains. HSE performance is a growing corporate social responsibility for oil firms and it is indeed a true reflection of a company's values and vision for future (Guillard, 2002). Every single disaster, accident or mishap is just not ruinous to the company, per se, but also stakes the welfare of the society at large and hence implementation and responsible adherence to Health, Safety and Environment (HSE) practices plays a vital role.

The Health and Safety Executive (2006), in its 2005/2006 statistics on work related health and safety in Great Britain observed that 2 million people were suffering from illnesses they believed was caused or made worse by their current or past work, 212 workers were killed at work, 146,076 other injuries to employees were reported.

30 million working days were lost with 24 million due to work related ill-health and 6 million due to work place injury.

Accidents and ill health are costly to the workers and their families. They can also hurt companies because, in addition to costs of personal injuries, they may incur far more costs from damage to property and lost production (Kenei, 1995). Occupational health and safety is therefore concerned with ensuring the working conditions of the employee remains healthy and safe. The primary objective is to uphold the employee's well being. This is achieved through studying the work environment in order to determine and identify hazards that affects employees (Mberia, 2001).

### **2.2.1.1 Occupational Health**

Occupational health refers to the general state of the physical, mental and emotional well-being of employees at the work place. A healthy employee is one who is free of injury, mental and emotional problems (Mathias et.al, 1994). A joint International Labor Organization / World Health Organization (ILO/WHO) committee defined the subject in 1950 as "the promotion and maintenance of the highest degree of physical, mental and social well being of workers of all occupations" (Gardiner,1998).

In the past, issues of safety have been given more consideration than health, with a lot of practices targeting the manufacturing set up (Kenei, 1995). Gardiner (1998) observed that Occupational Health is a multidisciplinary activity concerned with the prevention of ill health in employed populations. This involves a consideration of a two-way relationship between work and health. It is as much related to the effects of the working environment on the health of the worker as to the influence of the workers state of health on their ability to perform the tasks for which they were employed. Its main aim is to prevent, rather than cure, ill health from whatever it arises from the workplace. Gardiner further observed that the relationship between the worker and the world of work is complex. The worker brings to the place of work a pre-existent health status, influenced by so many factors- only some of which are under the worker's direct control. The health outcome could be caused by work, modulated by work or unrelated by it.

Mathias, et.al (1994) observed that a health hazards is a potential to cause harm to health. Health hazards may be biological, chemical, physical, ergonomic or psychological in nature. A health risk is the likelihood that a health hazard will cause harm in the actual circumstance of exposure. There are several occupational health hazards in the workplace, and include biological, chemical, physical, psychological and ergonomic health hazards.

(i) Biological agents- these agents include:

- a) Blood - borne infections such Hepatitis B, Hepatitis C and HIV/AIDS. This is despite the non-occupational methods for transmission of these diseases, for example from unprotected sex.
- b) Vector borne infections such as malaria.
- c) Food and water borne infections.
- d) Infections spread by the droplets and close contact TB such as and meningococcal meningitis.
- e) Zoonotic infections such as anthrax, ornithosis and fever.

(ii) Chemical agents - this include gases, vapor, particulate matter of toxic dust, lead, acid, carbon dioxide ,asbestos, and other toxic chemical agents

(iii) Physical hazards: -These include light, heat, cold, noise, vibration, pressure and radiation.

(iv) Ergonomic hazards: - These include repetitive strain injury (RSI) , low back pain, posture and speed of work

(v) Physiological hazards: - These include occupational stress, post-traumatic stress disorder (PTSD), multiple chemical sensitivity, severe fatigue, work load pressure

### 2.2.1.2 Safety

Safety is concerned with an accident free working environment, with focus being to identify, investigate, control and eliminate risks and hazards which causes accidents.. Work accidents may result to minor and severe injuries, with cases of death reported at times (Armstrong, 1997). Accidents also damages the company's assets and reputation.

There are many aspects of safety that are considered in the workplace, all dependent on the nature of the economic activity. The most common safety considerations include: fire safety, machinery safeguarding, working at heights, electrical safety, personal protective equipment,

working in confined spaces, manual handling, compressed air safety, inspection of lifting equipment and pressure vessels, accident reporting and investigation and analysis.

### **2.2.1.3 Environment**

The Environment includes the physical factors of the surroundings of human beings, including land, water, atmosphere, climate, sound, odour, taste, the biological factors of animal plants and the social factor of aesthetics. It includes both the natural and the built environment (The Environmental Management and Coordination Act, 1999). It is the totality of circumstances surrounding an organism or group of organisms, especially the combination of external physical conditions that affect and influence the growth, development, and survival of organisms (The American Heritage Dictionary of English Language, 2000).

In the oil industry, environmental performance is mainly linked to emissions, which are to air, water (surface and ground) or soil (Guillard, 2002).

The American Petroleum Institute (2005) observed the following core categories of environmental parameters in relation to the oil and gas industry:

- a) Spills and discharges – comprising of hydrocarbon spills to the environment and controlled discharges to water (both inland waterways and to the sea) resulting in significant operational, environmental or community impact.
- b) Waste and residual materials – consisting of hazardous and non-hazardous waste disposal as well as recycling, reusing and reclaiming materials that would otherwise have been considered hazardous.
- c) Emissions – including greenhouse gas emissions, flared and vented gases.
- d) Resource use – primarily the energy used in industry operations.

### **2.2.2 Examples of Past Disasters in the Global Oil Industry**

Several disasters have been documented in the past within the global oil industry that is related to Health, Safety and Environmental (HSE) performance. Some examples include:

#### **(a) The Mexico City LPG Distribution Center Explosion, 1984.**

Some 11,000 m<sup>3</sup> of Liquefied Petroleum Gas (LPG) was stored in six 1600 m<sup>3</sup> spheres and 48 horizontal cylindrical bullets, all in close proximity. The legs of the spheres were not

fireproofed. A leak of LPG from an unknown source was ignited; and a fierce engulfed the spheres, exploding one after the other in series. The nine recorded explosions resulted into 542 fatalities and 7000 injuries (Wells, 1997).

**(b) The Fire on Piper Alpha Oil Rig, United Kingdom North Sea, 1988.**

An explosion occurred and subsequent fire on 16<sup>th</sup> July 1988 on the Occidental Oil's offshore Piper Alpha oil rig in the British Sector of the North Sea. 167 oil workers were killed, the oil platform was totally destroyed and the United Kingdom's hydrocarbon production temporarily dropped by 11%. (Wells, 1997).

**(c) The Exxon Valdez Oil Spill in Alaska, 1989.**

The Exxon Valdez oil tanker spill in 1989 was one of the largest man-made environmental disasters ever to occur at sea, seriously affecting thousands of plant and animal species. 11 million gallons of crude oil was spilled. The ship struck a reef as it maneuvered out of its shipping lane to avoid icebergs. A jury in 1994 awarded \$ 287 million in actual damages and \$ 5 billion for punitive damages (based on a single year's profit at that time by Exxon). Exxon spent \$2 billion for clean up efforts, and it took up to 4 years to finish the exercise (www.wikipedia.org).

**(d) The BP Texas City Refinery Process Accident, 2005.**

On March 23, 2005, the BP Texas City Refinery experienced a catastrophic process accident. It was one of the most serious US workplace disasters of the past two decades, resulting in 15 deaths and more than 170 injuries (*The B.P US Refineries Independent Safety Review Panel*, 2007).

**2.2.3 Measuring Health, Safety And Environmental (HSE) Performance**

The primary purpose for measuring Health, Safety and Environmental performance is to provide information on the progress and current status of strategies, processes and activities used by an organization to control risks to health, safety and environment. (Health and Safety Executive, 2001). Measurement information sustains the operation and development of an HSE management system and so the control of these risks by providing information, identifying areas where remedial action is required , providing a basis for continuous improvement and providing feedback and motivation.

Wells (1997) observed that performance standards are the basis for planning and measuring the achievements in the operations of the company. This includes the performance of the company with respect to health, safety and environment. Setting performance standards is based on hazard reviews carried out on the organization, which involve hazard identification and risk assessment.

The Health and Safety Executive (2001) observed that organizations find health and safety performance measurement a difficult subject. They struggle to develop health and safety performance measures that are not based solely on injury and ill-health statistics, which is the traditional approach to measuring health and safety performance. Health and safety differs from many areas measured by managers because success results in the absence of an outcome (injuries or ill-health) rather than a presence.

Organizations need to recognize that there is no single reliable measure of health and safety performance. What is required is a 'basket' of measures or 'balanced scorecard' providing information on a range of health and safety activities. (Health and Safety Executive, 2001).

#### **2.2.4 Performance Indicators in Health, Safety and Environment (HSE)**

Performance indicators are factors which enable the early identification of degrading elements in performance. They are usually from critical plant operating parameters which affect health, safety and environmental performance. Performance indicators can be taken from various levels of an operating system - for example, at component level, safety protection level, plant level and management level (Wells, 1997).

##### **2.2.4.1 Injury/ Ill-health Statistics**

The Health and Safety Executive (2001) observed that organizations find health and safety performance measurement a difficult subject. They struggle to develop health and safety performance measures that are not based solely on injury and ill-health statistics, which is the traditional approach to measuring health and safety performance.

There were problems with using injury and ill-health statistics alone as the only measure of health and safety performance:

- a) Under-reporting – an emphasis on injury and ill-health rates as a measure, particularly when related to reward systems, can lead to such events not being reported so as to ‘maintain’ performance
- b) Whether a particular event results in an injury is often a matter of chance, so it will not necessarily reflect whether or not a hazard is under control. An organization can have a low injury rate because of luck or fewer employees exposed, rather than a good health, safety and environment management.
- c) Injury rates do not often reflect the potential severity of an event, merely the consequence. For example, the same failing to adequately guard a machine could result in a cut finger or an amputation.
- d) People can stay off work for reasons which do not reflect the severity of the event.
- e) There is evidence to show there is not necessarily a relationship between ‘occupational’ injury statistics (e.g. slips, trips and falls) and control of major accident hazards (e.g. loss of containment of flammable or toxic material)
- f) A low injury rate could lead to complacency. A low injury rate results in a few data points being available. There must have been a failure in order to get a data point. In addition, injury statistics reflect the outcome and not the causes.

#### 2.2.4.2 Lagging Health and Safety Performance Indicators

Mearns, et.al. (2003) described these as *reactive measures, measures of failures or outcome measures*. These are reactive measurements include injuries at work and work-related ill-health and other losses like damage to property, incidents, hazards and faults, weakness or omissions of performance. Wells (1997) termed these measures as *direct performance indicators*, and noted that the most common performance standard used for safety studies is the number of *Lost Time Injuries (LTI)*.

Wells (1997) further observed that the number of incidents is usually taken as the overall indicator. The repetitiveness of an incident suggests either poor knowledge or mastery of the initiating cause of the incident sequence, or an inadequate procedure or poor design. The factor can be measured by the impact on the surrounding environment, the amount of compensation paid to the parties affected, and the consequences with regards to the company’s reputation, the cost of restoring equipment and the cleanup operation, and the number of victims on and off site.

The International Association of Oil and Gas Producers (2005) outline guidelines for performance reporting in the oil and gas industry as follows:

1. *Number of Fatalities* – the total number of company employees and/or contractor employees who died as a result of an accident or occupational illness.
2. *Lost Work Days Case (LWDC)* – any work related injury or illness, other than a fatal injury, which results in a person being unfit for work on any day after the day of occurrence of the occupational injury
3. *Lost Time Injury (LTI)* - this is a fatality or a lost work day case. The number of LTIs is the number of is the sum of fatalities and the lost work days cases.
4. *Lost Time Injury Frequency (LTIF)* – this is the number of lost time injuries (sum of fatalities and lost work day cases) per 1,000,000 man hours worked.
5. *Hours Worked in a Year (000 's)* - this are the total hours worked.
6. *First Aid Cases (FAC)* – these are cases not sufficiently serious to be reported as medical treatment or more serious cases but nevertheless require minor first aid, such as dressing on a minor cut, removal of a splinter from a finger. FACs are not recordable cases
7. *Medical Treatment Cases (MTC)* – these are cases not severe enough to be reported as fatalities or lost work day cases or restricted work day cases but are more severe than requiring simple first aid treatment.
8. *Restricted Work Day Cases (RWDC)* – the number of cases that do not result in a fatality or a lost work day case but do result in a person being unfit for full performance of the regular job on any day after the occupational injury.
9. *Total Recordable Cases (TRC)* – this is the sum total of number of fatalities, lost work day cases, restricted work day cases and medical treatment cases. It does not include first aid cases.
10. *Total Recordable Cases Frequency (TRCF)* – this is total recordable cases (TRC) per 1,000,000 man hours worked.
11. *Number of Days Unfit for Work* – this is the sum total of calendar days (consecutive or otherwise) after the days on which the occupational injuries occurred, where the persons involved were unfit for work and did not work.
12. *Occupational Illnesses* – this is any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment. This may be caused by inhalation, absorption, ingestion



of, or direct contact with hazards, as well as exposure to physical and psychological hazards. It will generally result from prolonged and repeated exposure.

Examples include: noise induced hearing loss, respiratory diseases such as asbestosis, asthma; skin disease such as dermatitis as well as mental ill-health.

13. *Occupational Injury* - any injury such as a cut, fracture, sprain or amputation which results from a work-related activity or from an exposure involving a single incident such as deafness from an explosion, one-time chemical exposure, back disorder from a slip or a trip, or an insect or a snake bite.

14. *Significant Incidents* - are incidents which cause or have the potential to cause serious injury and /or fatality, or significant structural damage. The description of the incident should be sufficiently detailed to allow other organizations to share important safety learning's arising from the incident.

These incidents are *categorized* into:

- a) *Vehicle accidents* - involving motorized vehicles such as cars and trucks. Pedestrians struck by vehicles are also classified here.
- b) *Air transport incidents* - involving aircraft
- c) *Falls* - where a person falls off, over or onto something.
- d) *Struck by* - where injury results from being hit by moving equipment
- e) *Caught in between* - where persons are crushed or injured between moving parts or objects.
- f) *Explosions or burns* - incidents caused by burns, toxics gases, asphyxiation or other effects of fires and explosions
- g) *Drowning and electrocution*
- h) *Others* - where the incident cannot be logically placed under the above headings, such as a terrorist shooting.

### 2.2.4.3 Leading Health and Safety Performance Indicators

Mearns, et.al. (2003) observed that leading indicators are used to identify potential problems before they are realized as incidents or accidents. They are measures of the health and management system activities that promote health and safety culture. These measure organizational factors such as policy, organizing, planning and implementation, performance, operation, maintaining and improving the systems and the development of a health and safety culture. This is achieved through audits, reviews and surveys.

Guillard (2002) observed that *Potential incidents reported (or near misses, including unsafe conditions or acts) per person* working in a particular organization were one of the proactive performance indicators. A *Near Miss* is an uncontrollable event or chain of events which, under slightly different circumstances, could have resulted in an injury, damage or loss. Wells (1997) referred to these approaches as *Indirect indicators*, being specific measurements of performance of various safety program elements. It includes organizational and management processes such as accountability and responsibility.

Some examples that reflect safety management, accountability and responsibility include a policy statement, a health, safety and environment management system, management commitment to safety, requirements for procedures and individual performance measurement.

#### **2.2.4.4 Environmental Performance Indicators**

The American Petroleum Institute (2005) highlighted the core environmental performance indicators applicable to the industry:

- a) Hydrocarbon spills to the environment – the number and volume of hydrocarbon liquids greater than 1 barrel (159 liters) that reach the environment.
- b) Controlled discharges to water – quantities of hydrocarbons present in controlled discharges to a water environment (both inland and waterways or to the sea).
- c) Hazardous waste – quantities of regulated hazardous waste disposed.
- d) Greenhouse gas emissions – the annual emission of greenhouse gases (GHG) as total CO<sub>2</sub> equivalent (potential and as individual species, from facilities owned and/or managed by company).
- e) Flare and vented gas – the total mass or volume of hydrocarbon gas, both vented and flared to the atmosphere from operations, and reported separately.
- f) Energy use – the total quantity of primary energy consumed in oil and natural gas operations including the primary energy that is generated on site or imported.
- g) Environmental management systems – the implementation of an environmental management system (EMS).
- h) Community Complaints – the number of community complaints due to operational activities.

#### 2.2.4.5 Normalization Factors

It is generally good practice to measure and report performance based on both absolute and normalized quantities to provide a more complete and balanced representation of the performance and sustainable progress (The American Petroleum Institute, 2005).

The guide further observed that companies report normalized performance indicators for a number of reasons, including, tracking performance over time, comparing performance among similar business operations within the company and facilitating performance benchmarking with other companies. However, the variability in how companies report normalized data presents a challenge, because companies use different normalization factors for different activities and for different comparison purposes. Occupational injury and illnesses data are normalized on the basis of the number of employees or number of hours worked; and reported as injury/illness rates. On the other hand, environmental performance indicators are normalized on the basis of physical quantities related to output or input.

The American Petroleum Institute (2005) gives a guideline on the generic normalization factors used.

Table 1: Generic Normalization Factors used in the Oil and Gas Industry.

OIL AND GAS INDUSTRY SECTOR	NORMALIZATION FACTOR
Exploration and Production	Production of crude oil, in barrels of oil equivalent
Refining	Refining throughput
Transportation and terminals	Product delivered or terminal throughput
Pipeline	Pipeline throughput
Marketing (Retail)	Motor fuel sales
Marine	Cargo transported

Source: "Oil and Gas Industry Guidance on Voluntary Sustainability Reporting: Using Environmental, Health, Safety, Social and Economic Performance Indicators" American Petroleum Institute (API), (2005).

## 2.3 Benchmarking Health, Safety and Environmental (HSE) Performance

### 2.3.1 Overview

Guillard (2002) observed that a large part of the available knowledge on Health, Safety and Environment (HSE) cannot directly be exploited. It needs to be transformed into a set of performance targets, and a method to reach the set targets. This is precisely what benchmarking does.

One of the major difficulties many organizations faced when wanting to make use of published statistics about HSE is that definitions often differ between data sets, and between organizations and their local or national authority. Even when definitions vary only slightly, gathering compatible and meaningful information becomes a difficult task. In addition, it is difficult to assess whether the information gathered is truly applicable to a specific kind of business (Guillard, 2002). Kolk (2004) noted that a judgment of performance indicators in Health, Safety and Environment (HSE) as such, without context and comparison, is difficult. As a result, forms of benchmarking have emerged for both internal and external purposes. Companies frequently benchmark their health, safety and environmental performance to the averages for the sector and, in the US, for the manufacturing industry as a whole.

Internal and peer benchmarking therefore provides an alternative to providing meaningful and up to date data from organizations in the same line of business. Health, Safety and Environment (HSE) is however one of the most innocuous disciplines to benchmark, as the information is not commercially sensitive, and there is no legal reason why it cannot be shared (Guillard, 2002). Once the required information has been obtained and analyzed, the organization must prepare itself to move forward and improve its performance. HSE management systems and practices do not differ much between various types of industries, making it relatively easy to find new and better practices to adopt.

## 2.3.2 Global Efforts in Health, Safety and Environmental (HSE) Performance

### Benchmarking

There are documented evidence of deliberate efforts made, by industry associations or individual companies in the global oil and gas industry, to benchmark Health, Safety and Environmental (HSE) performance.

With a global membership producing over half of the world's oil and a third of the world's gas, The International Association of Oil & Gas Producers (OGP) acts as a focal point for the coordination and progression of best practices in HSE performance for its members in all the areas of the world in which they operate. This is achieved, in part, through co-operative initiatives; such as those aimed at forming best practice guidelines related to specific HSE challenges. This is achieved through partnering with members to organize HSE symposiums, such as the 2007 Middle East HSE Symposium (International Association of Oil & Gas Producers, 2007).

Petrotech, in collaboration with India's Oil Industry Safety Directorate, held a seminar on "Benchmarking of HSE in the Oil and Gas Industry" in 2006 (Petrotech, 2007). The *GASEX 2002*, an important platform for the oil and gas industry in the Asia-Pacific, had as one of its themes "*Benchmarking to Improve HSE Performance*" (Asean Energy, 2007). The 3<sup>rd</sup> Annual Middle East HSE Symposium for the oil and gas sector will be held in November 2007 in Doha, Qatar (Touch Oil and Gas, 2007).

Outside the oil and gas industry, Kolk (2004) observed that Procter & Gamble referred to a major HSE benchmarking study with other multinationals ( BASF, Dow, Du Pont, Eastman Kodak, Shell Chemicals and Solutia) carried out by an external consulting company. Kolk further observed that one of the major findings of the benchmarking exercise was that selecting, measuring and managing the right indicators for the organization involved in the health, safety and environmental benchmarking activity remains the greatest challenge in the near future. The Health and Safety Executive documented various benchmarking surveys carried out between 2001 and 2006 aimed at improving health and safety performance in the United Kingdom (Health and Safety Executive, 2001). Findings from these studies point out

that benchmarking has been successful in improving health, safety and environmental (HSE) performance practices.

#### **2.4 Health, Safety and Environment (HSE) in Kenya**

Health and safety issues at the work place are not a recent development in employee welfare and development. These issues emerged at the onset of industrialization when enlightened employees began to voluntarily improve the working conditions of employees at the workplace (Mberia, 2001). Mberia further observed that the seriousness of health, safety and environment at the workplace is illustrated by governments in most countries globally by making them a policy issue. Most countries have come up with legislation that provides guidelines to organizations on the implementation of health, safety and environmental issues.

In the U.S, the Department of Labor's Occupational Health and Safety Administration (OSHA), created in 1971, is the main federal agency charged with the responsibility of enforcement of safety and health legislations (Occupational Health and Safety Administration, 2007). The National Institute for Occupational Safety and Health (NIOSH) is concerned with research and development in occupational health and safety through provision of guidelines and technical support (National Institute for Occupational Safety and Health, 2007). On the other hand, the Environmental Protection Agency (EPA), established in 1970, is the federal agency charged with the responsibility of setting and enforcing national standards, under a variety of environmental laws, in consultation with the state, tribal and local governments (Environmental Protection Agency, 2007).

In the U.K, the Health and Safety Commission is responsible for health and safety regulations in Great Britain. The Health and Safety Executive and the local governments are the enforcing authorities who work in support of the commission (Health and Safety Executive, 2007). The Environmental Agency is the leading public body for protecting and improving the environment in England and Wales (Environmental Agency, 2007).

The International labor Organization (ILO) is also keen in ensuring the health and safety of the worker. For example, key ILO labor standards in the area of chemical safety are:

- a) The Chemicals Convention (No. 170) of 1990, and
- b) The Prevention of Major Industrial Accidents Convention (No. 174) of 1993.

In particular, Convention No. 174 seeks to protect workers, the public and the environment against the risks of major industrial accidents. It requires ratifying states, in consultations with interested parties in their countries, to formulate a coherent national policy to be implemented through preventive and protective measures to major hazards and installations, and where practicable, promote the use of the best available safety technologies (Barichoo, 2006).

In Kenya, Occupational Health and Safety legislation is administered and enforced by the Directorate of Occupational Health and Safety Services (DOHSS) under the Ministry of Labor and Human Resources Development. The Factories and Other Places of Work Act, Cap 514, of the Kenyan laws was enacted in 1951 to make provisions for the health, safety and welfare of persons employed. There have been several subsidiary legislations (or rules) to the Act enacted since then to address specific health and safety concerns and include:

- a) Woodworking Machinery Rules, 1959
- b) Docks Rules, 1962
- c) Cellulose Solutions Rules, 1964
- d) The Fire Risk Reduction Rules of 2007
- e) The Hazardous Substances Rules of 2007 (Factories & Other Places of Work Act, 1972).

There have been several amendments to the Act that have given rise to other subsidiary legislations. These include:

- a) First Aid Rules, 1977
- b) Protection of Eyes Rules, 1978
- c) Electrical Power (Special) Rules, 1979
- d) Building Operations and Works of Engineering Construction Rules, 1984
- e) Noise Prevention and Control Rules, 1996
- f) Health and Safety Committee Rules, 2004
- g) Medical Examination Rules, 2005 ((Factories & Other Places of Work Act, 1972).

Other legislations that related to the health and safety in Kenya include:

- a) The Public Health Act, Cap 242.
- b) The Radiation Protection Act, Cap 243.

Environmental legislations in Kenya are a more recent development. The enactment of the Environmental Management and Coordination Act (EMCA) of 1999 led to the establishment of several enforcement bodies in environmental management; and include:

- a) The National Environmental Council - chaired by the Minister for Environment.
- b) The National Environmental Management Authority (NEMA)
- c) Provincial and District Environmental Committee.
- d) The Public Complaints Committee.

(The Environmental Management and Coordination Act, 1999).

The National Environmental Management Authority (NEMA) was established to exercise general supervision and coordination on all matters relating to the environment, and to be the principal instrument of the government in the implementation of all policies relating to the environment (The Environmental Management and Coordination Act, 1999).

The Act (EMCA) is supplemented by other subsidiary legislations, and includes:

- a) The Environmental (Impact Assessment and Audit) Regulations, 2003
  - b) The Environmental Management and Coordination (Waste Management) Regulations, 2006.
  - c) The Environmental Management and Coordination (Water Quality) Regulations, 2006
- (The Environmental Management and Coordination Act, 1999).

petroleum products in Kenya (Appendix III).

Convenience sampling was used in the study because it satisfactorily met the sampling objectives and was cheaper and easier to conduct. The Kenya Petroleum Refinery Ltd and the Kenya Pipeline Company Ltd were conveniently selected because they handled bulk quantities of petroleum products in the country, and were therefore of significant importance to the Kenyan oil industry and to the research study.

### 3.3 Data Collection

A structured questionnaire was used to collect the primary data. The questionnaire had both closed and open ended questions to provide both quantitative and qualitative data for statistical analysis. Initial contact with respondents was made through telephones, after which the questionnaires were sent personally by hand, by post and through electronic mail.



## **CHAPTER 3 : RESEARCH METHODOLOGY**

### **3.1 Research Design**

Descriptive survey was used in this research study. The sample of the study was selected from the population through the convenience sampling technique, while primary data was collected through questionnaire.

### **3.2 Population and Sampling Design**

The petroleum industry in Kenya consists of firms operating at various levels: exploration and production (the National Oil Corporation of Kenya, NOCK), procurement (firms importing refined or crude oil), refining (the Kenya Petroleum Refinery Ltd), distribution (the Kenya Pipeline Company Ltd and other firms distributing the refined products to retail outlets or to industrial users by rail or road) and retailing (firms that have retail outlets, such as petrol stations and sell directly to consumers). The population of study was therefore made up of all petroleum companies operating in Kenya.

The sample for the study was made up of 40 oil companies. It consisted of the Kenya Petroleum Refinery Ltd (KPRL), the Kenya Pipeline Company Ltd (KPC) and all the 38 oil marketing companies (OMC) licensed by the Ministry of Energy to import and process petroleum products in Kenya (Appendix III).

Convenience sampling was used in the study because it satisfactorily met the sampling objectives and was cheaper and easier to conduct. The Kenya Petroleum Refinery Ltd and the Kenya Pipeline Company Ltd were conveniently selected because they handled bulk quantities of petroleum products in the country, and were therefore of significant importance to the Kenyan oil industry and to the research study.

### **3.3 Data Collection**

A structured questionnaire was used to collect the primary data. The questionnaire used both closed and open ended questions to provide both quantitative and qualitative data for statistical analysis. Initial contact with respondents was made through telephones, after which the questionnaires were sent personally by hand, by post and through electronic mail.

The target respondents were Health, Safety and Environment (HSE) Managers or their equivalents within the target organizations.

### 3.4 Data Analysis and Interpretation

The study sought to attain the following research objectives: to identify the key indicators used in measuring Health, Safety and Environmental (HSE) performance by Kenyan oil companies, establish whether Kenyan oil companies benchmarked these performance measurement practices and to examine the challenges they faced when undertaking these benchmarking programs. The data obtained was edited and checked for accuracy, coded and tabulated.

Content analysis was used to analyze the data collected. The technique involves the analysis where the communication content from interviews, written texts or speeches are categorized and analyzed. This method enables the researcher to focus on the issues that bring out the themes in each objective. The researcher can therefore quantify and analyze the presence, meanings and relationships of such themes or concepts, and then make inferences about the messages with the texts, the audience, and even the culture and the time of which these are part. These approaches have been successfully used by Kandie (2001) and Njau (2000).

## CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

### 4.1 Introduction

The chapter outlines the analysis of the data from responses of structured questionnaires (Appendix II) sent to respondents with regards to benchmarking HSE performance measurement practices in the Kenyan oil industry. Data was collected from 10 firms from the population of interest. 5 firms responded by indicating that information confidentiality policies prevented them from sharing the requested data, and therefore declined to give any information. The findings from the study were then analyzed, interpreted and summarized.

### 4.2 Organizational Features of the Company

#### 4.2.1 Position in the Company

Respondents were asked to indicate what their positions were within their organizations. Five companies placed the responsibilities of the HSE function under dedicated HSE managers, while two companies placed the responsibilities of the HSE function under a depot manager, who then combined the HSE and the administrative functions. One company each placed the HSE functions the Human Resources Manager, the Chief Engineer and the Logistics Manager.

This indicates that companies in the Kenyan oil industry generally recognized that the management of HSE was a critical function within the company, requiring dedicated resources at key managerial positions. This is very important both from the statutory compliance perspective and from the point of view of corporate responsibility and risk management.

#### 4.2.2 Company Ownership Structure

The companies were required to indicate the ownership structures of their organizations. Six of the companies indicated that they were locally incorporated, while 4 were multi-national subsidiaries. Amolo (2002) had observed in his research that 75% of the oil companies surveyed were foreign-owned, with only 25% being locally incorporated. However, since the liberization of the oil industry in 1994, more and more local firms have entered the market, whilst some foreign multinational oil firms have pulled out their operations from Kenya in the recent past. There has led to increased competition within the industry, with firms under pressure to improve their operations to remain competitive in the oil market. HSE has therefore

become more and more important as a corporate strategy to woo consumers who are having more choices and becoming more demanding.

### 4.2.3 Core Business of the Company

Companies were required to indicate their core business within the Kenyan oil industry. Eight companies indicated that they imported and processed petroleum products in the Kenya; six were in the retail business, while one company was in the refining and pipeline transportation but handled the bulk of the petroleum products in the country. The nature of the core businesses within the industry determines the HSE strategies used and the performance measurement practices employed unique to each business. Oil companies handling bulk products tend to value HSE more and therefore invest more in infrastructure that enhances their safety, mainly due to the higher risks inherent with handling bulk oil products.

## 4.3 Health, Safety and Environment (HSE) Practices in the Organization

### 4.3.1 The Balance between HSE and Profitability

Companies were requested to indicate the balance between HSE and profitability in their organizations.

Table 4.1: The Balance between HSE and Profitably in the Organization.

Description	Frequency
Making money is the only concern. HSE is seen as costing money, the only important issue in avoiding extra costs	0
Money is spent to make the HSE improvements necessary to comply with legal requirements, but saving money by cost-cutting is important	2
It is not clear how HSE and profitability are balanced. Line managers spend most of their time on operational issues	2
The company tries to make HSE the top priority, whilst understanding that HSE contributes to profit. It accepts delays to get contractors up to the standard in terms of HSE.	1
Management believes that HSE makes money, so balancing HSE and making money is a non-issue.	6

Source: Energy Institute (2002).

Six companies demonstrated that their HSE culture was generative, implying that HSE was strongly integrated into their business practices. No company indicated that making money was the only concern and that HSE was seen as costing money, the only important issue in avoiding extra costs. Oil companies in Kenya therefore believe that HSE makes money, so balancing HSE and making money is a non-issue. HSE is a core business value that should not be compromised for monetary gains. HSE performance is a growing corporate social responsibility for oil firms and is indeed a true reflection of the company's values and vision for the future.

#### 4.3.2 Health, Safety and Environment (HSE) Policy

Companies were required to indicate whether or not they had in place an HSE policy. Seven companies indicated that they had in place HSE policies while three companies did not have any HSE policies in place. This is despite the fact that HSE plays a critical role in the oil industry. An HSE policy is the basis of a good HSE performance measurement and continuous improvement. The policy gives an overall the requisite commitment and impetus to drive HSE practices within organizations by charting out a vision and providing guidance on how to achieve the stated objectives. A HSE policy requires top leadership commitment and clear assignment of responsibilities that involves everyone within the organization, and not the HSE function alone.

#### 4.3.3 Measurement of Health, Safety and Environmental Performance

Companies with HSE policies were required to indicate whether they measured their HSE performance. Six companies with HSE policies actually measured their HSE performance. The primary purpose for measuring HSE performance is to provide information on the progress and current status of strategies, processes and activities used by an organization to control risks to health, safety and environment. Measurement information sustains the operation and development of an HSE management system and hence the control of these risks by providing information, identifying areas where remedial action is required, providing a basis for continuous improvement and providing feedback and motivation.

#### 4.3.4 HSE Performance Measurement Indicators

Companies were required indicate whether they applied any of the HSE performance measurement indicators listed below.

Table 4.2: HSE Performance Measurement Indicators

Performance Measurement Indicator	Frequency
<b>Safety</b>	
No. of Fatalities	6
No. of Lost Time Incidents (LTI)	6
No. of Restricted Work Cases (RWC)	6
No. of Medical Treatment Cases (MTC)	6
No. of Total Recordable Cases (TRC)	2
Total Recordable Cases Frequency (TRCF)	2
No. of Man-hours without LTI (Million)	4
No. of First Aid Cases (FAC)	6
No. of Vehicle Accidents	6
No. of Miles Driven (Million) without Accidents	3
No. of Fires and Explosions	4
No. of Near Misses and Incidents	3
No. of Unsafe Acts per Audit	2
No. of HSE Meetings Held	6
No. of Emergency Response Simulations	3
No. of Overdue Statutory Equipment Checks	2
Annual Statutory Health & Safety Audit	6
<b>Health</b>	
No. of Occupational Illnesses	5
Total Recordable Occupational Illnesses Frequency	1
No. of Overdue Statutory Medicals Examinations	1
<b>Environmental</b>	
No. of Product Spills	4
No. of Community Complaints	3
Annual Statutory Environmental Audit	6
Hazardous Waste Accumulated (Tonnes)	3

All the companies that measured their HSE performance used the following performance indicators: the number of Fatalities, Lost Time Incidents (LTI), Restricted Work Cases (RWC), Restricted Work Cases (RWC), Medical Treatment Cases (MTC), First Aid Cases (FAC), Vehicle Accidents, HSE Meetings held as well as Annual Statutory Health and Safety and Environmental Audits. Three companies used the number of Man-hours without LTI, Fires and Explosions and Product Spills while two companies used the number of Miles Driven without Accidents, Near Misses, Emergency Response Simulations and Community Complaints.

management practices. This is largely attributed to the stringent legislation on health, safety

Performance indicators are factors which enable the early identification of degrading elements in performance. They are usually from critical plant operating parameters which affect health, safety and environmental performance. Performance indicators can be taken from various levels of an operating system, for example, at component level, safety protection level, plant level and management level. There is however no single measure of HSE performance.

office give guidelines and direction on any changes required in the measurement practices of HSE

Kenyan oil companies give issues of safety more consideration more than occupational health and environment issues. In addition, they apply lagging or reactive performance indicators such injury and health statistics as well as environmental spills as opposed to leading or proactive performance indicators such as unsafe act audits.

#### **4.3.5 Review of HSE Performance Measurement Practices**

Companies were required to indicate whether they reviewed their HSE performance measurement indicators. Four companies who measured their HSE performance frequently reviewed their measurement indicators; one company sometimes reviewed their measurement indicators and one company constantly reviewed their measurement indicators.

#### **4.4 Benchmarking HSE Measurement Practices**

Companies further indicated that the review of HSE performance measurement indicators were done annually as part of the annual HSE Audit programs for the company. Consequently, monthly Key Performance Indicators (KPIs) in HSE were then tracked against set objectives in monthly HSE meetings. In addition, companies indicated that individual HSE performance was included in every employee's annual performance scorecard; and subsequently given a significant weighting when appraising the employee's overall performance. Other companies indicated that all performance measurement indicators in the company, including in HSE, are reviewed annually when new performance contract targets were signed. Reviewing these

performance measurement indicators provided a basis for continuous improvement by providing feedback and motivation.

#### **4.3.6 Triggers of Reviews in HSE Performance Measurement Practices**

Companies were required to indicate what triggered their reviews of HSE performance measurement practices. Four companies that reviewed their measurement practices indicated that statutory (legal) requirements triggered the need to review their HSE performance measurement practices. This is largely attributed to the stringent legislation on health, safety and environmental issues that have put unprecedented pressure on Kenyan oil companies' business operations. The Directorate of Occupational Health and Safety Services (DOHSS) and the National Environmental Management Authority (NEMA) have become stricter in enforcing legal requirements in health and safety as well as in environmental issues respectively. Three companies that reviewed their measurement practices indicated that their corporate head offices gave guidelines and direction on any changes required in the measure practices of HSE performance. Subsidiaries of multi-national companies periodically rolled out policies relating to performance measurement practices. This requirement is to enable performance monitoring across business units within the group. This however has the potential of conflicting with the local legislations in the countries in which they operate.

A third of the companies were triggered by competition to review their measuring practices. This implies that the firms do not continuously scan their business environment to look for new ideas for improvement. In addition, respondents indicated that the requirements to comply with quality systems such as ISO 9000 forced them to review their measurement practices.

### **4.4 Benchmarking HSE Measurement Practices**

#### **4.4.1 Benchmarking Policy**

Companies were required to indicate whether they had a policy towards benchmarking of any activity in the organizations. Five companies indicated that although a benchmarking policy was not explicitly mentioned on its own, their companies' mission statements, vision and procedures contained substantial reference to values with respect to continuous improvement, such as being "best in class" in their business operations. Companies also cited key performance indicators (KPIs) being reviewed quarterly and annually to reflect changes in



business environment in order to make the company competitive, were sometimes triggered by competitor activities. This is an aspect of benchmarking. Five companies, however, lacked a clear strategy on benchmarking, and did not use benchmarking as a formal tool for continuous improvement.

#### **4.4.2 Benchmarking HSE Performance Measurement Practices**

Companies were asked to indicate whether they benchmarked their HSE measurement practices. Six out of the ten companies did not benchmark their HSE performance measurement practices. Benchmarking helps to measure and compare results, highlight gaps in performance, identify the potential for improvement and change the way business is conducted, in order to achieve superior HSE performance.

#### **4.4.3 Sources of Benchmarks in HSE Performance Measurement Practices**

Companies were required to indicate the sources of their benchmarks in their HSE performance Measurement Practices. All companies that benchmarked their HSE performance measurement practices indicated that they benchmarked internally within the company. Internal benchmarking is applied between various functionalities within the company, or can be applied by large multi-national companies to compare performance of their various operations or divisions. Internal benchmarking involves participants from a single company, and is therefore relatively simple to set up and organize. None of the companies benchmarked their practices did not use corporate entities outside the oil industry.

#### **4.4.4 Benchmarking Approaches and Types**

Companies were requested to indicate the approaches and types of benchmarking used in their HSE performance measurement practices. All the four companies that benchmarked their HSE performance measurement practices indicated that they used internal benchmarking while two of the companies used peer benchmarking. None of the companies used external benchmarking.

Peer benchmarking involves sharing information with other organizations, which are often competitors, and therefore can be limited by commercial and legal consideration. The main advantage of peer benchmarking over internal benchmarking lies in the comparison with other companies. On the other hand, external benchmarking is conducted between companies that operate in different businesses but face similar issues and employ the same type of business

practices. Performance measurement breakthroughs are more likely to result from external benchmarking than any other form of benchmarking.

All of the four companies that benchmarked their HSE performance measurement practices applied best practice benchmarking, which focuses on the process rather than the product, especially the management practice part of the process. Three of the companies used strategic type of benchmarking, where it considers the results of other benchmarking practices in the light of the strategic focus of the firm, i.e. the overall business strategy in relation to results of the benchmarking study. On the other hand, product benchmarking involves tearing down a competitor's product to see what can be learned from its design and construction. Product-based benchmarking is used a tool to solve specific problems proving difficult to solve by other improvement techniques.

#### **4.5 Challenges in benchmarking projects**

Respondents were asked to enumerate challenges they faced when carrying out benchmarking projects. These are discussed in Section 4.6.3 of this chapter.

#### **4.6 Summary of Discussions**

The objectives of the study were to identify the key indicators used in measuring Health, Safety and Environmental (HSE) performance by Kenyan oil companies, to establish whether Kenyan oil companies benchmark their (HSE) performance measurement practices and to identify the challenges faced by oil companies in Kenya while undertaking benchmarking programs. The findings are summarized below with respect to each objective.

##### **4.6.1 Identify Key Indicators Used in Measuring Health, Safety and Environmental (HSE) Performance by Kenyan Oil Companies.**

The study revealed that seven out of ten companies had an HSE policy that provided a fundamental framework for all HSE practices within in the company. In addition, six companies had a culture where management believes that HSE makes money, so balancing HSE and making money was a non-issue. The company's plans include time and resources to get contractors up to the standard in terms of HSE. The study further revealed that half of the respondents were HSE managers, with senior managerial positions and dedicated to HSE

management. This indicates that the Kenyan oil industry recognizes that the management of HSE is a critical function within the company, a very important aspect both from the statutory compliance perspective and from the point of view of corporate responsibility and risk management.

Six out of the seven companies with established HSE policies measured their HSE performance. The primary purpose for measuring HSE performance is to provide information on the progress and current status of strategies, processes and activities used by an organization to control risks to health, safety and environment. Measurement information sustains the operation and development of an HSE management system hence the control of these risks, by providing information, identifying areas where remedial action is required, providing a basis for continuous improvement and providing feedback and motivation.

Performance indicators enable the early identification of degrading elements in performance and are usually from critical plant operating parameters affecting HSE performance at various levels such as safety protection level, plant level and management level. The study revealed that all companies that measured their HSE performance used the following performance measurement indicators: the number of Fatalities, Lost Time Incidents (LTI), Restricted Work Cases (RWC), Restricted Work Cases (RWC), Medical Treatment Cases (MTC), First Aid Cases (FAC), Vehicle Accidents, HSE Meetings held, Annual Statutory Health and Safety Audit, Inland Product Spills and Annual Statutory Environmental Audit.

The study also revealed that there is no single reliable measure of HSE performance. What is required is a 'basket' of measures providing information on a range of health, safety and environmental activities. These are largely determined by the core business activity, the size of the organization as well as the HSE culture within the company, among other factors. Specifically, core business within the industry affects the focus on the HSE strategies within each business, thereby determining the choice and preference of the HSE performance measurement practices employed. In addition, Kenyan oil companies give issues of safety more consideration than occupational health and environment issues, while applying lagging or reactive performance indicators such injury and health statistics as well as environmental spills as opposed to leading or proactive performance indicators such as unsafe act audits.

#### 4.6.2 Establish Whether Kenyan Oil Companies Benchmark Health, Safety and Environmental (HSE) Performance Measurement Practices.

The study revealed that statutory (legal) requirements triggered the need to review the HSE performance measurement indicators. This is largely attributed to the current stringent legislation on health, safety and environmental issues that have put unprecedented pressure on Kenyan oil companies' business. In addition, subsidiaries of multi-national companies periodically received policies relating to performance measurement practices from their parent companies. Corporate head offices gave guidelines and direction on any changes required application of standards. This requirement is to enable performance monitoring across business units within the group. This however has the potential of conflict with the local legislations in the countries where they operate. In Kenyan oil companies, triggers of reviews in the practices by competition is low, implying that the firms in the industry do not continuously scan their business environment to look for new ideas for improvement.

**4.6.3 Identifying the Challenges Faced by Oil Companies in Kenya Undertaking Benchmarking** helps to measure and compare business results, highlight gaps in performance, identify the potential for improvement and change the way business is conducted, in order to achieve superior performance. From the study, however, half of the companies lacked a clear strategy on benchmarking, and did not use benchmarking as a formal tool for continuous improvement. Clearly, there was lack of understanding of the benefits of benchmarking within the Kenyan oil firms.

From the study, only four out of all the ten companies indicated that they benchmarked their HSE Performance Measurement Practices. HSE is one of the most unattractive disciplines to benchmark, as the information is not commercially sensitive, and there is no legal reason why it cannot be shared. However, all the companies benchmarked their HSE performance measurement practices internally within the company. Internal benchmarking is looking at the differing levels of performance within the organization and highlighting best practice for dissemination to other parts. It is applied between various functionalities within the company, or can be applied by large multi-national companies to compare performance of their various operations or divisions. The benefits of internal benchmarking are that it is cost effective, that it is easy to gain access to all the information required, that it does not require you to give anything away to competitors or other outside parties and that the processes will be analogous. The

drawbacks of internal benchmarking include that fact that even the very best internal practices may not be adequate in the face of external pressures , and by is only looking internally, the organization miss the bigger picture.

Finally, there is often lack of awareness on the benefits of benchmarking HSE practices. This is None of the respondents however benchmarked their practices with corporate entities outside the oil industry. External benchmarking, when conducted between companies that operate in different businesses but face similar issues and employ the same type of business practices, results in measurement breakthroughs. Few Kenyan oil companies benchmark their HSE performance measurement practices, but by concentrating on internal benchmarking for improvement, many of them miss out on the benefits from peer benchmarking and external benchmarking. In particular, when peer benchmarking is carried out in form of cooperative study involving a significant number of players in the industry, the information gained can be at a very detailed level and all participants will benefit.

#### **4.6.3 Identifying the Challenges Faced by Oil Companies in Kenya Undertaking Benchmarking Programs in HSE.**

Companies indicated the several challenges they faced when benchmarking programs.

Firstly, Oil companies, especially those dealing in the distribution and retailing end of the market, have has downgraded the importance of the HSE function within the company. Accordingly, the management of HSE is not made critical both from the statutory compliance and corporate responsibility perspectives. Benchmarking HSE practices is therefore largely absent.

Secondly, Organizations lack the resources to finance the benchmarking exercise. Allocation of resources usually conflicts with other business priorities. In most cases, cost and the resources required to bring a benchmarking program to a satisfactory conclusion are often underestimated. In addition, when there is lack of top management commitment, it becomes difficult to set aside resources required to drive the benchmarking exercise.

Thirdly, the unwillingness to share information among competing firms in the oil industry has greatly hindered benchmarking efforts. In addition, gathering competitive intelligence requires

considerable time, effort, and money. Furthermore, there can be ethical and legal questions about some intelligence activities.

### 5.1 Conclusions

Fourthly, there is often lack of awareness on the benefits of benchmarking HSE practices. This is often caused by lack of strategic objectives to drive organizations to search for the best practices that improve performance. More often there is lack of capability and skills within the company to carry out benchmarking activities. This can only be improved through training and clear policies towards benchmarking. In addition, challenges arise due to over-reliance on quantitative data or metrics. By focusing on numbers companies sometimes focus on data and not on the processes used to produce the data.

Data can also be manipulated. Consequently, there is a misunderstanding of the underlying reasons for the performance measures to strategic competencies and key processes. Finally, respondents indicated there were challenges arising from cultural difficulties in transferring “best practices” within multinational firms due to differences in behavioral and cultural background of the organizational members in the foreign subsidiaries of the firm.

## CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

Benchmarking is a powerful tool for continuous improvement that helps to measure and compare business results, highlight gaps in performance, identify the potential for improvement and change the way business is conducted in order to achieve superior performance. Benchmarking goes beyond the mere setting of goals. It focuses on practices that produce superior performance. Performance improvement is the key driver behind benchmarking, as it offers the only real justification to make available the resources necessary for a complete benchmarking.

Benchmarking can be internal to a company, between the various divisions of a company or can involve peer organizations, including competitors. It can also be external, bringing together companies in different lines of business. Each type offers various advantages, but also disadvantages, so it is essential to carefully consider what type best meets the business needs of the organization before embarking on a benchmarking program.

From the study, few Kenyan oil companies benchmark their HSE performance measurement practices. In addition, they lacked specific benchmarking frameworks that enable them to fully utilize the benefits of benchmarking. Few have clear policies towards benchmarking, while a significant proportion of those firms that benchmark concentrate on internal benchmarking. Although cost effective, internal benchmarking may inhibit breakthroughs by confining practices within one's own organization, or within subsidiary operating units for the case of multinational companies. Kenyan firms did not benchmark their HSE measurement practice outside the oil industry.

Kenyan oil companies need to realize that HSE is a core business value that should not be compromised for monetary gains, and therefore HSE performance is a growing corporate social responsibility and indeed a true reflection of a company's values and vision for future.

In addition, the Kenya oil companies need to realize that there is no single reliable measure of HSE performance. What is required is a basket or a balanced scorecard of measures providing information on a range of health, safety and environmental activities. These are

largely determined by the core business activity, the size of the organization as well as the HSE culture within the company, among other factors.

Many challenges encountered when benchmarking HSE practices in general within the Kenyan oil industry. They include lack of top management commitment, low priority of HSE function within companies, lack of resources as well as unwillingness to share information among competing partners. However, there are numerous benefits accrued from undertaking benchmarking programs. Benchmarking creates a culture that values continuous improvement to achieve excellence, increases sensitivity to changes in the external environment, shifts the corporate mind-set from relative complacency to a strong sense of urgency for ongoing improvement, focuses resources through performance targets set with employee input and prioritizes the areas that need improvement by sharing the best practices between benchmarking partners.

## 5.2 Recommendations

In order to utilize the numerous benefits of benchmarking, the Kenyan oil industry needs to fully apply the concept to improve health, safety and environment, cost drivers and margin enablers. This is a deliberate move that will involve the development of a comprehensive benchmarking policy in each organization. This will then be followed by capacity building through training of manpower and the development benchmarking champions within organizations to drive the implementation of benchmarking projects.

The Kenyan oil industry needs to collaborate and form partnerships amongst the various organizations to encourage information sharing. There is however a limitation due to commercial and legal considerations with regard to commercially sensitive information. The "Benchmarking Code of Conduct" offers guidance regarding areas where information exchanged is to be avoided, and also advise on ways and means to engage ethically in this type of benchmarking. This encourages information sharing.

Peer benchmarking can also be conducted through consultants who facilitate the data collection and analysis, and the comparisons of the metrics. Consultant firms also bridge the competent gaps evident in Kenya oil industry with regards to benchmarking. Consultancy can be obtained from lead firms or research institutes such as the universities.



There are numerous global initiatives in HSE benchmarking within the global oil industry that Kenyan firms can partner to fully utilize benchmarking. Membership to global HSE symposiums, conferences, initiatives and institutions will tremendously improve their HSE benchmarking capabilities.

### **5.3 Limitations of the Research**

Data collection using questionnaires becomes more effective when the researcher personally collects the questionnaire as it offers the researcher the opportunity to clarify issues and obtain additional information from respondents. During the data collection for this study, a number of respondents mailed back their answered questionnaires.

A number of respondents did not respond to the questionnaires, citing their organization's policy prohibiting sharing of information. This suspicion is precisely the same problem arising from peer benchmarking, where organizations feel that the information given may become accessible to competitors.

Some respondents declined to respond to the questionnaire because they did not practice HSE in their organizations. A number of the new oil marketing companies are made up of very few personnel, have no product depots and therefore do not directly handle products. They therefore declined to give information. This fact implies the number of oil companies in Kenya who benchmark HSE performance measurement practices much lower, since HSE practices do not exist at all within their organizations.

### **5.4 Suggestions for Further Research**

This research study focuses on the use of benchmarking to improve health, safety and environmental performance measurement practices in the Kenyan oil industry. The concept of benchmarking is however applicable across all businesses, processes and functions.

Further research on benchmarking can be done within the oil industry but on different operational aspects of the business such as supply chain or logistics. Further research on benchmarking can be done outside the oil industry, and especially within the service industry on a number of operational aspects. Further, research could be done to evaluate the effect of legislation, or lack of it, on benchmarking practices in manufacturing sector of Kenya.

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## APPENDICES

### Appendix I: Questionnaire

#### Declaration

The research is aimed at understanding how your company and others in the Kenyan oil industry benchmark their Health, Safety and Environmental (HSE) performance measurement practices for continuous improvement.

There is no right or wrong answer. The findings will be confidential, strictly for academic use, and at no time will your name or the name of your company be mentioned anywhere in this report. Your honest participation will be highly appreciated.

#### Part A

Q1. What is your position in the Company? .....

Q2. Is the Company locally incorporated or a multi-national subsidiary? (Please tick one)

- Locally incorporated
- Multi-national subsidiary
- Other (Please specify):- .....

Q3. What is the core business of your Company within the Kenyan oil industry?  
(Please tick all relevant/appropriate)

- Importation
- Refining
- Distribution
- Retailing
- Other (Please specify):-.....

#### Part B

Q4. Do you have a Health, Safety and Environment (HSE) Policy? (Please tick one)

- YES
- NO

Q5. If YES in Q4 above, do you measure Health, Safety and Environmental performance?  
(Please tick one)

- YES
- NO

Q6. If YES in Q5 above, indicate the HSE performance measurement indicators used in your Company. (Please tick all relevant/appropriate)

	Performance Measurement Indicator	Used in Company?
	<b>Safety</b>	
1	No. of Fatalities	
2	No. of Lost Time Incidents (LTI)	
3	No. of Restricted Work Cases (RWC)	
4	No. of Medical Treatment Cases (MTC)	
5	No. of Total Recordable Cases (TRC)	
6	Total Recordable Cases Frequency (TRCF)	
7	No. of Man-hours without LTI (Million)	
8	No. of First Aid Cases (FAC)	
9	No. of Vehicle Accidents	
10	No. of Miles Driven (Million) without Accidents	
11	No. of Fires and Explosions	
12	No. of Near Misses and Incidents	
13	No. of Unsafe Acts per Audit	
14	No. of HSE Meetings Held	
15	No. of Emergency Response Simulations	
16	No. of Overdue Statutory Equipment Checks	
17	Annual Statutory Health & Safety Audit	
	Others:-.....	
	<b>Health</b>	
18	No. of Occupational Illnesses	
19	Total Recordable Occupational Illnesses Frequency	
20	No. of Overdue Statutory Medicals Examinations	
	Others:-.....	
	<b>Environmental</b>	
21	No. of Marine Product Spills	
22	No. of Inland Product Spills	
23	No. of Community Complaints	
24	Annual Statutory Environmental Audit	
25	Hazardous Waste Accumulated (Tonnes)	
	Others:- ....	

**Part C**

**Q7.** What is the balance between HSE and Profitability in your Company? (Please tick one)

1	Making money is the only concern. HSE is seen as costing money, the only important issue in avoiding extra costs	
2	Money is spent to make the HSE improvements necessary to comply with legal requirements, but saving money by cost-cutting is important	
3	It is not clear how HSE and profitability are balanced. Line managers spend most of their time on operational issues	
4	The company tries to make HSE the top priority, whilst understanding that HSE contributes to profit. It accepts delays to get contractors up to the standard in terms of HSE.	
5	Management believes that HSE makes money, so balancing HSE and making money is a non-issue. The company's plans include time and resources to get contractors up to the standard in terms of HSE.	

**Q8.** Do you review HSE performance measurement indicators in your Company? (Please tick one)

- Never
- Rarely
- Sometimes
- Frequently
- Constantly

Please give details:- .....

**Q9.** What triggers the need to review HSE performance measurement indicators in your Company? (Please tick all relevant/appropriate)

- Statutory (legal) requirements
- Competition
- Customer complaints
- Corporate Head Office
- Accidents
- Others (Please specify):- .....

**Q10.** (a) Does your Company have any policy on Benchmarking? (Please tick one)

- YES
- NO

(b) If YES, in 10 (a) above, do you benchmark your HSE performance measurement practices? (Please tick one)

[ ] YES [ ] NO

Q11. If YES, in Q10 (b) above, in which industry do you search for best practice when benchmarking your HSE performance measurement practices?  
(Please tick all relevant/appropriate)

- [ ] Within your company (internally)
- [ ] With other corporate entities locally (outside oil industry)
- [ ] Within the group operating companies (locally)
- [ ] Within the group operating companies ( for multinational companies)
- [ ] Within the local oil industry
- [ ] Within the global oil industry
- [ ] Other (Please specify):-.....

Q12. Which of the following **Benchmarking Approaches** do you apply when benchmarking your HSE performance measurement practices?

(Please tick all relevant/appropriate)

- 1. Internal Benchmarking [ ]
- 2. Peer (Competitor) Benchmarking [ ]
- 3. External (Non-Competitor) Benchmarking [ ]
- 4. Others (Please Specify) .....

Q13. Which of the following **Benchmarking Types** do you apply when benchmarking your HSE performance measurement practices? (Please tick all relevant/appropriate)

- 1. Problem-based Benchmarking [ ]
- 2. Product Benchmarking [ ]
- 3. Best - Practice Benchmarking [ ]
- 4. Strategic Benchmarking [ ]
- 5. Others (Please Specify) .....

Q14. What **Challenges** have you encountered when carrying out your benchmarking HSE programs?



**Appendix II: Oil Marketing Companies in Kenya**

- 1 ADDAX
- 2 ALBA
- 3 BAHRIYA
- 4 BAKRI
- 5 CHEVRON
- 6 DALBIT
- 7 ENGEN
- 8 EPPIC
- 9 FOSSIL
- 10 FUELEX
- 11 GALANA
- 12 GLOBAL
- 13 GULF
- 14 HASHI
- 15 HASS
- 16 INTOIL
- 17 JOVENNA
- 18 KENOL
- 19 KOBIL
- 20 METRO
- 21 MGS INTL
- 22 MOBIL
- 23 MOCO
- 24 MULOIL
- 25 NOCK
- 26 OILCOM
- 27 OILMARK
- 28 PENTOIL
- 29 PETRO
- 30 RIVA
- 31 ROYAL
- 32 SHELL
- 33 SOUTH WEST
- 34 TECAFLEX
- 35 TOTAL
- 36 TRANSOIL
- 37 TRITON
- 38 VITOL

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**Source:** Kenya Petroleum Refineries Ltd (KPRL) *Hydrocarbon Entitlement Statement, July, 2007.*