UNIVERSITY OF NAIROBI

SCHOOL OF LAW

WASTE OIL MANAGEMENT BY PETROLEUM BUSINESS OPERATORS: AN ANALYSIS OF THE LEGAL AND INSTITUTIONAL FRAMEWORK

By:

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DECLARATION

I MICHIEKA KEMUNTO MON'GINA , Registration number G62/75200/2014 do declare that this project report is a result of my own research and has not been submitted in any other institution of higher learning for examination. Where other people's works have been cited, the same have been dully acknowledged.

Sign.....Date.....31st October 2018..

I .....being a University of Nairobi Supervisor do confirm that this project report has been undertaken and submitted under my supervision.

Sign.....Date.....

DEDICATION

This work is dedicated to my immediate family; my parents Prof. Ratemo Michieka and Mrs Esther Michieka, my children Chante and Amali, and my brothers Nyakundi, Amenya, and Michieka who all support and encourage me to be the best.

I dedicate it to all the members of my extended family, relatives and friends. To my parents who have inspired and supported us all to excel and reach for the sky.

ACKNOWLEDGMENT

I must begin by thanking the God the Almighty for all that He has done for me this far and for all that He has promised He will continue to do.

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A very special thankyou to my supervisor, Prof. Albert Mumma, thank you very much for the walking with me through every step of the process, your advice, encouragement and dedication despite your busy schedule, you always made time to guide and discuss with me my progress and advise me on the way forward. Without your guidance and support, this thesis would not have been completed.

To them all, I am grateful.

LIST OF CASES

Alice Muthike Maingi& Others v Kenya Pipeline Corporation & NEMA [HC Petition No.526 of 2015].

Gidion Mbuvi Kioko v Attorney General & 6 others, [HC Petition No.223 of 2012].

Kenya Ports Authority v East Africa Power & Lighting Company Ltd, [CA No.41 of 1981].

Purity Wambui Muriithi v Highlands Mineral Water [CA No.58 of 2014].

Republic v Attorney General & 2 others *exparte* Joseph Shiroko (2015) eklr

Republic v Kenya Ports Authority & 2 others *exparte* Kaburu& Sons Ship Contractors & another [2006] eklr

Republic v Minister for Transport & Communication & 5 others *exparte* Waa Ship Garbage Collector & 15 others [Misc application No.617 of 2003, eklr

LIST OF STATUTES, REGULATIONS AND GUIDELINES

Basel Convention on Transboundary Movement of Hazardous Wastes and their Disposal

Constitution of Kenya 2010.

Energy Act Cap 314.

Energy Regulations of 2013

Energy Licensing of Petroleum Road Transport Businesses Regulations of 2013.

Environmental Management and Coordination Act (EMCA), 1999.

EMCA (Waste Disposal) Regulations of 2006.

Environmental Regulations of 2003

Land Act of 2012

Medical Examinations Rules of 2005

Occupational, Safety & Health Act of 2007 (revised edition of 2010 of Hazardous Substances Rules of 2007)

Penal Code Cap 63

Petroleum Act of 116 (repealed)

Physical Planning Act 2012 (Revised edition 2010)

The Factory and Other Places of Work Act Cap 514 (Revised edition of 1999)

Trading Licensing Act Cap 497

Weights & Measures Act Cap 513

Waste Management & Coordination Regulations 2006

Water Act 2016 (Repealed 2002)

Wayleaves Act Cap 259

ABBREVIATIONS

API – American Petroleum Institute

ASTs – Above-ground Storage Tanks

EIA – Environmental Impact Assessments

EMCA - Environmental Management and Coordination Act

ERC – Energy Regulatory Commission

DOSHS –Directorate of Occupational Safety and Health Services

HSEQ – Health Safety Environment and Quality

IOM – Institute of Medicine

IPIECA – International Petroleum Industry Environmental Conservation Association

KEBS- Kenya Bureau of Standard

KMA – Kenya Maritime Authority

KPA – Kenya Ports Authority

KPC- Kenya Pipeline Company ltd

KPRL- Kenya Petroleum Refineries Limited

MARPOL- Marine Pollution

MSDS – Material Safety Data Sheet

NEMA- National Environmental Management Authority

NESAQ – National Environmental Standards for Air Quality

NTSA- National Transport and Safety Authority

ODMCS– Oil Discharge Monitoring and Control System

OMC's – Oil Marketing Companies

OSHA – Occupation Safety Health Act

OSMAG – Oil Spill Mutual Aid Group

PIEA – Petroleum Institute of East Africa

TPH – Total Petroleum Hydrocarbons

Schedule I

List of Respondents

Respondent 1 –Employee at National Environmental Authority (NEMA)

Respondent 2 - Employee in the Health, Safety, Environment & Quality department at the Kenya Pipeline Company (KPC)

Respondent 3 – Employee at Energy regulatory commission (ERC)

Respondent 4 – Employee in the Health, Safety & Environment department in a Petroleum Business Company

Respondent 5 – Employee in the Operations & Distribution department in a Petroleum Business Company

Schedule II

List of Interview Question

1. Briefly tell me about your organisation and your role and responsibilities.
2. What is are the responsibilities of your organisation with regards to the petroleum industry in Kenya with regards to oil spills?
3. What is your take on waste oil generation ie accidental or intentional through the conduct of the petroleum business?
4. What is your take on waste oil management with regards to oil spills in Kenya?
5. What is your take on oil spills with regards to transportation of petroleum products through the pipeline and road tankers?
6. How well is your organisation equipped to handle oil spills? Elaborate
7. What do you think your business partners should do or what measures should they take to avoid future spills?
8. What do you feel about the Sinai fire tragedy, Sachangwan tragedy and Kibwezi oil spill?
9. What lessons were learnt from the incidences above by your organisation?
10. What in your opinion is the role of Petroleum Business Operators in ensuring safe transportation and storage of petroleum products with regards to the environment?
11. What happens to the waste oil generated?
12. Do you think the legal and institution framework needs reforms to address the issue of waste oil management?

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ABSTRACT

For years' petroleum products comprising of fuels and motor oils have been used in different industries in Kenya notably by Petroleum Business Operators. These products are harmful to the environment in their processed form and become more dangerous and harmful when converted into waste oil. Waste oil if not properly disposed of can lead to devastating and long term harmful effects. Going back to previous years, the issue of waste oil management had not been looked into as the number of petroleum business operators was not as significant as it is today.

The waste oil generated through the cycle of petroleum operators either accidentally or intentionally through their business activities, ends up in the country's ocean, lakes, rivers, farms and streams which affects the environment, human and aquatic life and in other cases may lead to fatalities. If generated waste oil would be properly managed, handled and disposed of, it would encourage environmental sustainability. The study analyses the stages of the petroleum cycle, from importation, to transportation by different means, storage both bulk and at the retail service stations to disposal of the waste oil generated and the role of the legal and institutional framework throughout this cycle.

This study has found that activities in the different stages of the petroleum business lead to generation of waste oil that contaminate the environment. The study also found that proper disposal mechanisms that will not further contaminate the environment were a challenge. It also found that there lack implementation mechanisms to manage the disposal and to compel petroleum business operators to take full responsibility of their actions that lead to generation of waste oil. The study makes contributions to both the legal and institutional frameworks with regards to petroleum business practices as well as disposal of the waste oil aimed at protecting and preserving the environment

CHAPTER ONE

1.0. INTRODUCTION

1.1 Background of Study

Waste oil is any oil that contains impurities after use. It is any petroleum based synthetic oil that has been contaminated and is not suitable to be used for its initial and original purpose because of the presence of impurities and loss of its original properties.[1]

The United Nations Environmental Programme (UNEP) classifies waste oil as hazardous waste and falls under the category of controlled waste of the Basel Convention on the control of Transboundary Movements of Hazardous Wastes and their Disposal. [2] Waste oils are further described as minerals extracted from crude oil or manufactured as synthetic oils which are used for a variety of purposes ranging from heat and power transfer for cutting metal and used for lubrication.[3]

According to the California Department of Toxic Substances Control, petroleum products or oils are described as toxic hazardous wastes. They contain properties that make them potentially dangerous and harmful to human health and the environment. It further describes hazardous wastes as those exhibiting the following characteristics; ignitability, corrosively,

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[1] Secretariat of the Basel Convention. 2002. Technical Guidelines on Used Oil Re-Refining or Other Re-Uses of Previously Used Oil (R9). Basel Convention Series/SBC No. 02/05. Available at http://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/AdoptedTechnicalGuidelines/tabid/2376/Default.aspx

[2] European Commission (2006) Reference Document on Best Available Techniques for the Waste Treatments Industries. http://eippcb.jrc.ec.europa.eu/reference

[3] *ibid*

reactivity or toxicity. Contaminated soils are also considered as hazardous even though they do not possess all the above characteristics.[4]

Effects of waste oil on the ecosystem have a major impact on the ecosystem into which it is released. According to the Agency for Toxic Substances and Disease Registry (ATSDR), (1991) when petroleum hydrocarbons is released directly to water through spill or leaks, the contained hydrocarbon fractions will float on the water and form thin surface films.

Waste oil is any oil that contains impurities after use. It is any petroleum based synthetic oil. According to the United States Coast Guard, 35.7% of the oil spilled in the United States between 1991 to 2004 came from tank vessels, ships and others, 27.6% from facilities and other non-vessels, 19.9% from non- tank vessels and 9.3% from pipelines 7.4% from unknown spills. On the other hand only 5% of the actual spills came from oil tankers while 51.8% came from other vessel.[5]

The International Tankers Owners Pollution Federation (ITOPF) has tracked about 9,351 accidental spills that have happened since 1974.[6] According to this study most spills were as a result of routine operations such as loading and discharging cargo. 91% of the operational oil spills are small resulting in about 7 metric tons per spills. On the contrary, spills as a result of accidents like collision, groundings, hull failures and explosions are much higher with 84% of these involving fuel losses of over 700 metric tons.[7]

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[4]The Resource Conservation and Recovery Act. "Hazardous waste regulations" refers to Chapters 10 through 32 of Division 4.5 of Title 22 of the California Code of Regulations.

[5] United States Coast Guard (2007). "Cumulative Spill Data and Graphics". United States Coast Guard. Archived from the original on 2008-10-08. Retrieved 2008-04-10.

[6] *International Tanker Owners Pollution Federation (2008). "Oil Tanker Spill Information Pack". London: International Tanker Owners Pollution Federation. Retrieved 2008-10-08.*

[7] *"Atlantic Empress". Centre de Documentation de Recherche et d'Expérimentations. Archived from the original on October 19, 2007. Retrieved 2008-11-10*

The Constitution of Kenya 2010, Article 69 is clear on the states responsibility in ensuring sustainable utilization, management, exploitation and management of the environment. The state is required to encourage public participation in the management, conservation and protection of the environment. [8] The constitution of Kenya is committed in ensuring its citizens have a clean and healthy environment. State organs have a responsibility to promote sustainable development and eradicate all forms of environmental degradation.[9] It is therefore important that all oil waste that is generated be managed and disposed of in a responsible manner.

An oil spill is the release of a liquid petroleum hydrocarbon into the environment as a result of human activity which is a form of pollution. The term refers to oil spills released to land, ocean or coastal waters. They may be due to spills from tankers, drilling rigs and wells, spills, off shore platforms from refined petroleum products such as gasoline and diesel and their by-products, heavier fuels used by large ships such as bunker fuels or any spills of waste oils or oil refuse.

Clean up from oil spills is not easy and depends on a number of factors such as the temperature of the water and soil spilled on.[10] These spills could take weeks, months and even years to clean up and restore.[11]

Spills could occur accidentally through the way petroleum products are stored either underground or above the ground storage tanks which may develop leaks over time, through handling procedures, through transportation on water (tanker ships) and or land (tanker trucks)

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[8] The Constitution of Kenya 2010

[9] ibid

[10] Xia, Y. Q., and M. C. Boufadel (2010), The role of stratigraphy and geomorphology on the persistence of the Exxon Valdez oil spill in Alaska, paper presented at GSA North Eastern Section (45th Annual) and South Eastern Section (59th Annual) Joint Meeting, Geological Society of America Abstracts with Programs, 42(1): 94. Paper No. 25-2, Baltimore, Maryland, USA, 13-16 March 2010*(PDF) Lessons from the Exxon Valdez Oil Spill disaster in Alaska*. Available from: https://www.researchgate.net/publication/259392296_Lessons_from_the_Exxon_Valdez_Oil_Spill_disaster_in_Alaska [accessed Oct 08 2018].

[11] https:// response.restoration.noaa.gov/ Hindsight and Foresight: 20 Years After the Exxon Valdez Spill

through the pipelines.[12] Other spills could be due to offshore drilling and routine maintenance activities during cleaning of ships and tanker tracks, intentional oil discharges through sewers, burning of fuels, vehicle emissions.[13] All these are actions are by Petroleum Business Operators in the cause of their business operations.

Petroleum Business Operators in this study are the parties involved in the chain of the petroleum business. This will include the process of refining crude oil in a refinery. Kenya does not naturally generate its own petroleum products nor refine crude oil and wholly depends on importation. This is after the Kenya Petroleum Refinery Limited (KPRL), the only refinery that Kenya had and was used to refine crude oil. The Kenya Petroleum Refinery Limited (KPRL) a refinery that existed and operated in Mombasa. The pipeline that connected the refinery was 800km and run across the country from Mombasa through to Nairobi and western Kenya. The pipeline had terminals in Nairobi, Nakuru, Eldoret and Kisumu and is run by the Kenya Pipeline Company (KPC). The refinery was shut down in 2013 as a refinery but was opened in 2016 and is currently used to store refined products.[14]

In the absence of the refinery, the chain starts with the importation of refined petroleum products. Importation of the petroleum products is done through the Open Tender System (OTS)[15] This OTS system allows oil-marketing companies to access petroleum products at the same price hence managing fair competition in the petroleum market.

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[12] International Tanker Owners Pollution Federation Limited (ITOPF): Effects of marine oil spills(impact on coastal activities; impact on fisheries and mariculture). See also ITOPF publication "Protection of Fish Farms and Mariculture Facilities from Oil Spills" (to be ordered, not online).

[13] *ibid*

[14] The East African Business Magazine, March 28, 2015

[15] Ministry of Energy, "Affordable quality energy for all Kenyans," at Energy.go.ke/downstream

An oil refinery is an industrial plant where crude oil is refined or converted into petroleum products such as diesel, heating oil, gasoline, premium petroleum and fuel oil. Refining of petroleum products is the second stage in the production process after the crude oil has been extracted by oil rigs. Crude oil on the other hand is unrefined petroleum product that occurs naturally composed of hydrocarbon deposits and other organic materials.

The Ministry of Energy, that manages the OTS system, has set out rules and guidelines that the oil marketers who want to bid for the OTS should abide by. They include but are not limited to; the oil marketer having a valid licence issued by the Energy Regulatory commission (ERC) to carry out the business of importing, exporting and sale of petroleum products. They must have a transport and storage agreement signed by Kenya Pipeline Company (KPC) and should not have defaulted in paying for imported product allocated to them within the past three months.[16]

The Petroleum Business Operators who are the major players in the petroleum business should be held accountable for ensuring that operations of the petroleum products they handle and market is done in an environmentally friendly manner that cause minimal or no harm to the environment and the waste oil generated is managed. Most of the waste oil generated is either through accidental or deliberate spills.

Due to the non-management and regulation of the waste oil generated at service stations, some of the waste oils and contaminated oil end up at independent vehicle garage either directly from the service stations or through third parties like the waste oil collectors. Garage owners are not bound by any standards and end up affecting the businesses of oil marketers with regards to handling contaminated oil products that would be linked to the oil marketers.

[16] Kenedy Senelwa 'New Rules for fuel imports under OTS', The East African.co.ke Saturday November 15, 2014

Waste oil generated in whichever form must be managed and that which is caused from spills responded to with the urgency it deserves due to the toxic nature of the oil and the harmful effects the oil would have on both the environment and living organisms. According to the Office of Response and Restoration, the effects of oil spills are both physical and biochemical.[17] Spilled oil causes harm to human, plant and animal life due to the chemical components it possesses that are poisonous.[18]

Human health is adversely being affected by spills through inhaling, touching or eating contaminated foods. The International Petroleum Industry Environmental Conservation Association (IPIECA) states that due to the hazardous nature of the oils, the precautions taken during the clean-up process involves wearing protective clothing such as gas masks, water and oil proof gloves and overalls that cover the body as well as strong rubber boots. This will avoid direct inhaling of the vapours and touching and any direct body contact with the oil. [19]

The spills through ships could lead to some animal and living organisms becoming extinct either through death or inability to reproduce. Fish and other edible ocean organisms affected by spills become unsuitable for human consumption.[20]

The impact of oil wastage and spills can vary from minimal impact to large scale mortality within a certain geographical area. The environment is affected which also affects the resources and a wide range of species that are linked in a food chain including human food resources. The toxicity of oil can poison exposed organisms. When light oils such as diesel, are confined to a small are, the more toxic the damage is.[21] The extent of harm caused will also depend on

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[17] US Department of Commerce, National Oceanic and Atmospheric Administration: National Ocean Service

[18] *ibid*

[19] International Petroleum Industry Environmental Conservation Association (IPIECA): Biological Impacts of Oil Pollution: Fisheries • Oil spill responder safety guide at Htt://www.ipieca.org/publications/oilspills

[20] *ibid*

[21] New Zealand standards for offshore installations, maritime NZ at www.maritimenz.govt.nz/Environmental/Oil-and -oily-waste/Oil-biological-impact.asp

the exposure and amount of spill. The impact of oil on the environment depends on the properties and amount of spill, sensitivity of the area of spill and length of contact time the spill has had on the affected area.[22]

The Energy Regulatory Commission (ERC) established under the Energy Act Cap 314[23]is mandated to regulate the importation, exportation, transportation, refining, storage and sale of petroleum and petroleum products among other functions.[24]It also has a statutory social responsibility of protecting the interest of the consumer in exercising its duties[25]with regards to the use of petroleum products.

The Commission Is authorised under the Act to issue, renew, modify, suspend or revoke licences and permits for all undertakings and activities within the energy sector, which includes importation of petroleum.[26]

Sound management of petroleum related facilities and infrastructure is provided for under the Energy Act.[27] This relates to facilities that handle generation of waste oil so as to avoid pollution of the environment and human health through contact, inhalation or digestion. Unsafe disposal practices of waste oil can result to adverse effects to both the environment and health if not properly managed.[28]

According to the US agency for Toxic Substances and Disease Registry (1999) some of the TPH compounds can affect the human nervous system, cause headaches, dizziness, numbness on the feet and legs, eyes, skin, the blood and lungs.

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[22]*ibid*
[23] Energy Act Cap 314 S.4
[24] Ibid.S.5(a)(ii)
[25] Ibid.S.5(b)
[26] Ibid
[27] Energy Act, 2006
[28]Owiti B.O and Ndiritu H. M (2013)., *Waste Oil Utilization: Current Trends and Opportunities,* Proceedings of 2013 Mechanical Engineering Conference on Sustainable Research and Innovation, Volume 5, 24th - 26th April 2013

Poor waste management can lead to undesired results that most often than not may lead to risks to the human health. A report by the Daily Nation on 11 January 2016 revealed that foods sold in Nairobi have levels of toxins in them. A vendor who was interviewed reveled that she bought ten (10) liters of transformer oil for Kshs 7,000/- (Seven thousand Shillings) and used it for three (3) months to make potato chips from a frequent local supplier in Nairobi. The use of transformer oil is rampant as was advised by another resident in a different location in Nairobi. A medical practitioner further stated that consumption of such foods could lead to throat sores, wheezing, coughing and shortness of exposure as well as buildup of fluids in the lungs depending on the amount of exposure.[29]

This would also show that the institutions are more concerned with enforceability on the corporate garage companies because it is easier and the companies would want to void their brand and reputation being affected. NEMA and ERC have also not taken the initiative to train and inform the garage owners on the negative effects of petroleum products formed from their business on human health.

There has not been a reported case of the closure of the *jua kali* garages due to non-compliance to the environment or petroleum related laws about the businesses

The National Environment Management Authority (NEMA), established under the Environmental Management and Co-ordination Act No. 8 of 1999 (EMCA) is the principal instrument of the Government with authority to implement all policies relating to the environment.[30] NEMA is mandated to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of the Government in the

[29] www.nation.co.ke/news/Nairobi-residents-eating-poison-scientists-warn. reported on 11 January 2016
[30] http://www.nema.go.ke/index.php?option=com_content&view=article&id=5&Itemid=134

implementation of all policies relating to the environment[31]. Among its other mandates includes management of disposal of hazardous wastes such as used oil[32] through spills.

NEMA and ERC are mandated and have obligations to ensure that environmental management systems with regards to petroleum business are adhered to by persons and companies that engage in activities that generate waste oil. Complying with conditions such as providing specific, labeled storage containers for storing the used oil.

They are also not able to regulate the mushrooming of vehicle garages at every corner of the country and backyards of homes. There are also no laid out standards for the informal *'jua kali'* businesses with regards to garages. With over 80 registered oil marketing companies, 60 of which are active[33] and a handful of them being multinationals who dominate the market, they have the capacity to influence certain regulations to impose standard on all vehicle garages to operate within those standards specific to waste oil management

1.2 Statement of the problem

This study discusses the legal and institutional framework for waste oil management by Petroleum Business Operators. Waste oil is generated accidentally through spills or through deliberate actions that occur during operational processes. Accidental spills may occur through vessels or ships during berthing at the shoreline, through equipment faults.[34] Deliberate activities that lead to oil waste include human activities on land that involve transportation of products through tankers, water sports such as jet skiing and motor boats, drilling works.[35]

The Petroleum Business Operators who are the major players in the petroleum business should be held accountable for ensuring that operations of the petroleum products they handle and

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[31] EMCA 1999 Sec 9
[32] Legal Notice 121 Environmental Management and Coordination (Waste Disposal) Regulations of 2006
[33] Petroleum Insight Magazine of East Africa 4th Quarter, July – September 2017
[34] www.https://oilsplat.worldpress.com,"Causes & Effects of Oil Spills"
[35] *ibid*

market is done in an environmentally friendly manner that cause minimal or no harm to the environment and the waste oil generated is managed. Most of the waste oil generated is either through accidental or deliberate spills.

Due to the non-management and regulation of the waste oil generated at service stations, some of the waste oils and contaminated oil end up at independent vehicle garage either directly from the service stations or through third parties like the waste oil collectors. Garage owners are not bound by any standards and end up affecting the businesses of oil marketers with regards to handling contaminated oil products that would be linked to the oil marketers.

With over 100 registered oil marketing companies, 80 of which are active and a handful of them being multinationals who dominate the market, they have the capacity to influence certain regulations to impose standard on all vehicle garages to operate within those standards specific to waste oil management.

They are privately owned by Oil Marketing Companies (OMCs) who form the chain of Petroleum Business Owners and in other cases they are individually owned by Independent owners/ dealers. Some filing stations have other activities that may include a convenient store, restaurant, café, car wash and a service bay but the primary business is that of selling petroleum products.

It should be the responsibility of Petroleum business operators to make it a priority and push for implementation of the regulations that ensure the supply, storage, transfer and transportation of petroleum products has minimum leaks from pipes, tanks, pumps and hoses during receipt, storage, loading and offloading the products.

1.3 Objectives of the study

The study will aim to analyse the legal and institutional framework relating to Waste Oil Management through Spills generated by Petroleum Business Operators in Kenya.

The study aims to address the following objectives;

1. To analyse the effectiveness of the legal and institutional framework in relation to waste oil management through spills in Kenya.
2. To analyse the effectiveness of the legal and institutional framework with regards to disposal of the waste oil generated in Kenya.
3. To make proposals and recommend measures to be taken for reforms in the Petroleum Business in Kenya
4. To Make Proposals and recommend measures to be taken for reforms in the legal and institutional framework to manage waste oil through spills in Kenya.

1.4 Research Questions

The study will answer the following questions;

1. What is the current scope of the legal and institutional framework in the management of oil spills in Kenya?
2. Is Kenya's legal and institutional framework for the management of waste oil disposal generated by petroleum business operators effective and adequate?
3. If not what reforms should be undertaken to reform the legal and institutional framework?

1.5 Hypothesis

1. Waste oil management in Kenya is not fully addressed by the existing legislation.

2. Enforcement by institutions on waste oil management in Kenya is lacking.

3. Kenya's legislative and institutional frameworks on waste oil management is in need of reform.

1.6 Theoretical framework

This study relies on the theory of the life cycle analysis also known as cradle to grave management theory, the theory of zero waste and the theory of regulation.

1.6.1 Theory of life cycle analysis

This theory is also known as the cradle to grave analysis. It is used in the assessment of environmental impacts related with the stages of a product's life from cradle to grave.[36] It involves the analysis of the full cycle of a product from the resource extraction - 'cradle' to the phase where it is used and the disposal phase -'grave'.[37] In the case of oil waste, the theory considers the process of the petroleum lifecycle analysis from the refined petroleum products[38], transportation through the pipeline or road tankers, storage at the petrol refuelling stations, vehicle and industry use and final disposal of waste oil. [39]This theory shows the effects of our actions to the environment. The theory assesses the processes that a product goes through from its raw state, to generation and finally its disposal stage.

Improvements in the construction and maintenance standards of ships, training the ship handlers and crew so as to minimise human fault and error as much as possible, establishing management systems for ports, shipping companies and ships which ensure early detection of faults will help reduce spills through the ship.[40]All the players involved in this life cycle chain have a role to play in ensuring that their actions do not cause environmental harm and

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[36]Global Conference on Global Warming, DinçEr, I., Colpan, C. O., & Kadioglu, F. (2013). *Causes, impacts and solutions to global warming.*
[37]Ibid
[38] Petroleum Products descriptions-last updated 3/15/2011: Florida State of Environmental Protection
[39] Lifecycle Analysis Approach of Transportation of Fuels; State of Oregon, Department of Environmental Quality
[40]International Convention for Safety of life at sea (SOLAS) 1974

degradation. Each phase has a responsibility to ensure both the environment, humans and living organisms are not affected by their actions.

1.6.2 The Zero Waste Theory

This theory is about maximizing of efficiency and prevention of waste so as to address resource sustainability and other environment damages related to waste that include pollution and climate change. This theory defines waste as anything that is unusable, unwanted and unrecyclable. Proponents of this theory insist that waste is avoidable and unacceptable.[41]

Earliest known proponent includes Paul Palmer who used the term in 1973, dubbing his chemical recycling company as 'Zero Waste Systems'. He has since then expanded his work, writing *Getting to Zero Waste* in 2004.[42] This theory aims to stop the dumping of what would be considered as waste and advocates for recovery or conversion of materials at the end of a product lifecycle through materials recycling or reusing, biodegradation and incineration.

This Theory has been criticized for its ignorance of upstream waste prevention. Upstream waste prevention, involves the managing of the kind of waste, produced through industrial ecology principles that aim at reducing the amount and toxicity of waste produced which is not considered enough. The theory appears to have been applied with success in San Francisco California[43] where mandated recycling, compost programmes and policies banning plastic bags and Styrofoam take- out containers has resulted in the diversion of 78% of the municipal waste from Landfill and incineration.[44]

According to World Bank, sustainable development must be both inclusive and environmentally sound in order to reduce poverty and build shared success for today's

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[41] Zero waste theory and Practice https://philosophyandwaste.files.wordpress.com/2011/10/candaceandersonyork university.pdf (Accessed 30/06/2015)
[42] *ibid*
[43] *ibid*
[44] *ibid*

population to continue to meet the needs of future generations. It is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The aim of sustainable is to combine the economic, environment and social aspects of our activities.[45]

The theory of the life cycle analysis should ensure that actions of waste oil management at each stage are managed so as to avoid depleting and polluting the environment and if the environment is polluted during the by oil wastes, it can be restored to cater for the present and future generations who need and are entitled to a clean and healthy environment. The oil waste can be re-cycled and better use made out of it.

The Johannesburg Plan of Implementation (JPOI 2002) member states renewed their commitment to achieve the sound management of chemicals and hazardous wastes throughout their life cycles so as to minimise adverse effects on human health and the environment for sustainable development.[46] This was reaffirmed in the outcome document of Rio +20 of 2012, The Future we want.[47]

According to Agenda 21, effective control of the generation, storage, treatment, reuse and recycling, transportation, recovery and disposal of hazardous wastes is most important for proper health, natural resource management and environmental protection.it further states that prevention of generating of hazardous wastes as well as rehabilitating or restoring contaminated sites are the key elements and require knowledgeable and experienced people, financial resources, facilities, scientific and technical capabilities.[48]

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[45] Worldbank.org – Sustainable Development
[46] Sustainable Development. UN.org/ Chemicals and waste
[47] *ibid*
[48] *ibid*

The Basel Convention on Trans-boundary movement of hazardous wastes and their Disposal recognises the environmentally sound management of hazardous wastes as part of its wider issues of improved sanitation, water protection, economic and social development as well as solid waste management.[49]

The life cycle analysis aims at minimising waste oil getting into contact with the environment and living organisms and the disposal process such as re cycling adopted with the aim of achieving no waste or zero waste. At the end of the product (oil) oil lifecycle in the long run, there will be no waste as the product will have been treated and recycled into good use.

1.7 Literature Review

A number of scholars have contributed to the discourse on the waste oil management. This part analyses the various literature materials relevant to the topic of study. It is however important to note from the onset that environmental regulation is a relatively new approach to waste and pollution control, with most environmental legislation having been passed in the past Twenty to Thirty (20-30) years in developed countries, and even more recently in Kenya, which is a developing country.[50] Godfrey and Nahman[51] argue that regulatory controls in developing countries like Kenya remain the principle means of pollution and waste control, however failures in compliance as well as enforcement of waste legislation have resulted in deterioration in the management and in particular, the disposal of hazardous petroleum wastes.[52] Recent case studies undertaken by Dewale (a Business Developer) and Taiwo (Doctoral Researcher) during 2009 argue that waste management in Kenya is, in-effective and underfunded. Domingos,

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[49] *ibid*

[50] Godfrey and Nahman, 2007. 'Are Developing Countries ready for First World Waste Policy Instruments?' Conference Study for CSIR Natural Resources and the Environment, South Africa. Pp. (1-12).

[51] Ibid

[52] Institute of Economic Affairs, 2000. 'Petroleum Industry since Liberalization', Bulletin of the (Issue No. 41: November). Cape Town.

[53]suggests that institutions in Kenya responsible for waste management are weak along with weak legal controls.

Janine Benyus, in his book titled 'Biomimicry: Innovation Inspired by Nature'[54] argues that populations of what are commonly termed the developing countries are still growing and will aspire to the material standards of rich countries. So as to meet these future demands without unacceptable environmental damage, decision makers in industry need to adopt in their production facilities the operation of ecosystems in nature that generate no waste, the concept known as biomimicry.

Hesham Adly in his paper titled 'Sustainability and Development Resources Industrial Ecology as an Approach to Sustainability', demonstrates that good environmental management practices combined with appropriate policy initiatives not only improve the environmental management of used oil but also results in generating income off recycling and reselling of used oil.[55] He holds the view that historically, waste oil management practices in the petroleum industry have focused on end-of-pipe approaches to waste disposal especially where waste management policy is lacking or is inadequate. Bulk storage depots, retail service stations and commercial customers each generate vast quantities of used oil. He states that there are poor waste oil practices in the petroleum industry because of inadequate infrastructural support or waste management policy frameworks, which lead to severe environmental pollution.

A United Nations Report (Africa Review Report on Waste Management) states that although progress has been made in waste management policies and strategies, the use of economic instruments as well as implement the Polluter Pays Principles in waste management have not

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[53] Madison, W. I (1992) Used Oil: Wisconsin Department of Natural Resources Program, PUBL –WA-233097

[54]Benyus, J. M. (1997). *Biomimicry: innovation inspired by nature*. New York, Morrow at https://www.amazon.com/Biomimicry-Innovation-Inspired...Benyus/dp/0060533226

[55] Hesham Adly: Industrial Ecology as an Approach to Sustainability

yet matured in most African countries. [56] A research by World Bank shows that waste oils are disposed at landfills, which are not engineered to manage such waste stream. According to Komilis, Land filling has been the most common method of hazardous waste disposal across Africa. A report by the World Bank distinguished a sanitary landfill from an open dump.

An open dump is mainly where wastes are inspected and recorded then disposed of while engineered landfills attempt to minimize environmental impacts. Sanitary landfills incorporate measures to control gas and to collect and treat leachate, to apply a daily soil cover on waste, and also implement plans for closure and care long after the waste has stopped coming to the site. Where policy is inadequate and implementation is not policed it inevitably leads to wide-scale dumping onto domestic landfills, which are ill equipped to manage hazardous substances. Hazardous waste infrastructure for disposal of used oil in Africa is largely non-existent or poorly engineered as reported in the World Bank Report.

J.E. Otiende in his paper 'An Introduction to Environmental Education' stated that pollution can be viewed as any hindrance that prevents the use of water, air, plants, land or animals. It is the direct or indirect alteration or change of the physical, biological or possible hazard to the health, welfare or safety of any living organism.[57] His paper does not discuss waste oil or its management.

Thugge and Otieno, in their study entitled 'Unlocking the Future Potential for Kenya: The Vision 2030' hold the view that Kenyan Government Strategy Document of 2008 have specified and identified a number of environmental challenges faced in Kenya.[58] These include

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[56] United Nations, 2009. Africa Review report on Waste Management. Main Report Economic and Social Council Sixth Session of the Committee on Food Security and Sustainable Development (CFSSD-6)/Regional Implementation Meeting (RIM) for CSD-18 Addis Ababa, Ethiopia 27-30 October.
[57] J.E.Otiende, *An Introduction to Environmental Education,* Nairobi University Press, 1991
[58]Thuge, Ndung'u, and Otieno, 2009. Unlocking the Future Potential for Kenya: The Vision 2030. Kenyan Government Strategy Document.

unsustainable management of natural resources such as forests, wildlife and coastal marines, degradation of the environment through air pollution, hazardous and solid waste, desertification and climate change.[59] Kenya's inability to identify and develop strategic natural resources owing to mainly low innovative and exploration initiatives remains a source of concern according to Kenya's Vision, 2030. They further argue that there are also real threats to Kenya's natural resources through continued deforestation and poaching, human and wildlife conflicts, increased occurrence of alien and invasive species and depletion of marine resources - fish according to Kenya's Vision2030. [60] They continue to state that there remains a lack of effective policy, regulatory and institutional frameworks, and environmental degradation and encroachment into fragile ecosystems. Other environmental challenges cited by Kenya's Vision 2030 include low innovation in the utilisation of natural resources, inadequate capacity to apply scientific environmental research and the country's inability to adopt new technologies.

Thugge and Otieno in their study further demonstrate that to address pollution and improve waste management, Vision 2030 Kenya which is a long–term development goal aimed at; creating a globally competitive and prosperous country recommends development and enforcement of regulations on pollution and waste management, creating awareness on pollution and waste management, the design and application of economic incentive and dis-incentive measures, developing and enforcing regulations, public private partnerships for municipal waste management, and reduction in importation of oil with high SO2.[61]

However, the paper does not address the issues around waste oil generation and management.

[59]Ibid
[60]Ibid
[61]Ibid

Janis Bernstein in her paper "Alternative Approaches to Pollution Control and Waste Management: Regulatory and Economic Instruments" gives an overview of strategies and policy instruments in developed and developing countries to achieve waste management objectives. [62] It shows how regulatory instruments control pollution and manage solid and hazardous wastes. She further says that dumping used lubricant and oils into the ground water and onto landfills and using them as preservatives for wood causes damage and degradation to the environment. When the hydrocarbons degrade, they present long term negative effects on the environment.[63] However her paper does not specifically address the issue of waste oil management.

Mary Muia[64] in her project paper 'A Study of Used Oil Management: A Study of Nairobi City' addressed the dangers of reusing and discarding of motor oil in unfriendly environmental methods. Her study showed that the motor oil is improperly disposed off by 'jua kali' garages where it ends up being poured on the ground, in storm sewers and dumped into landfills. The oil also ends up in lakes, rivers and streams which threaten the aquatic life and leads to water pollution in Nairobi. The study further showed that there is no proper management of disposal of the used oil and there is a need to address this. It also showed that if used oil if properly managed can be more beneficial than harmful to the environment.[65]

This study also brought out the issue faced by oil marketers and petroleum business operators as being that of disposal of the used oil. However, it did not discuss the issue of management of used oil generated through the petroleum business.

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[62] Janis D. Bernstein, *Alternative Approaches to Pollution Control and Waste Management: Regulatory and Economic Instruments,* urban management and environment report no. 3, The World Bank, Washington D.C 1993.
[63] ibid
[64] M.W.Muia (2005), A Study of Used Oil Management: A Case Study of Nairobi City – Kenya . B.tech. Hons, - Production Engineering Moi University
[65] *ibid*

Tom Wanyama[66]in his study on the 'Generation and Management of Solid and liquid waste in the Jua Kali Sector he addressed the issue of wastes generated by the jua kali artisans and how the waste is disposed examining the environmental implications of the waste disposal method used as well as the role of the government in ensuring that the waste generated is properly disposed.

The study found that various wastes are generated form the activities of the jua kali artisans oils and greases being some of them. Methods used to manage and dispose the waste that the study found were open dumping and burning which enhances environmental degradation.[67] However the study did not discuss or address the issue of managing the waste in the motor vehicle industry.

1.8 Research Methodology

This research will be compiled through;

Primary Sources – This will be first-hand accounts, experiences and lessons in forms of face to face interviews with different stakeholders on their views on various aspects on waste oil management. This will give a well descriptive insight on the industry with regards to the legal and institutional framework with regards to waste oil management through spills.

Refer to Schedule I and II.

Secondary Sources – these will be existing articles and written information by other authors in relation to the issue in Kenya and other countries. This will also include the use of the internet, various acts, journals, statutes, and decided case law.

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[66] Wanyama.T (2000) Generation and Management of solid and Liquid Wastes in the Jua Kali Sector; A case Study of Metal Work and Motor Vehicle Jua Kali Enterprises in Kamkunji and Ziwani areas of Nairobi, Kenya. – Kenyatta University

[67] *ibid*

1.9 Chapter Breakdown

Chapter one is the introduction and back ground of the study. It also includes the research objectives, the statement of the problem, research questions, theoretical framework, literature review, methodology and chapter break down.

Chapter Two will discuss the Legal framework for the management of waste oil during transportation.

Chapter Three will discuss the Legal framework for the management of waste oil generated at the Retail outlets.

Chapter Four will discuss the Legal framework for the management of waste oil during the disposal stage.

Chapter Five will have findings and conclusions of the study and give recommendations on management on waste oil.

CHAPTER TWO

REVIEW OF THE LEGAL AND INSTITUTIONAL FRAMEWORK GOVERNING WASTE OIL GENERATED DURING TRANSPORTATION

2.0 Introduction

This chapter will discuss how waste oil is generated through the various methods that are used to transport petroleum products and the legal framework for each process. The transportation will start from importation of refined products transported through ships then transportation through the pipeline to different bulk storage facilities or depots. Thereafter transportation to the retail service stations by oil tankers and finally oil generated through cleaning of the oil tankers.

Transportation of petroleum products is done either through the pipeline or petroleum road tankers. Utmost due care to both the environment and human beings should be given to avoid or minimize oil spills at all costs. One major source of oil spills is tankers both water and land tankers.

The Energy Regulatory Commission (ERC) in consultation with the National Environmental Management Authority (NEMA), the National Transport and Safety Authority (NTSA), the Oil industry and the Directorate of Occupational Safety and Health Services (DOSHS) established the Health, Safety and Environmental Best Practices for road transport of petroleum products which are guidelines for the management of Health Safety and Environment for transport of petroleum products by road.[68]

The ERC is the body mandated to license transportation of petroleum products in Kenya

[68] Following the enactment of the Energy Act No. 12 of 2006, the Electricity Regulatory Board was transformed to the Energy Regulatory Commission (ERC). Consequently, the ERC was mandated to regulate Petroleum, Renewable energy and Electricity subsectors.

The laws governing environmental protection and conservation in Kenya are derived from the constitutional statutes and the ratified International Conventions. These laws regulate the establishment and operation of development projects such as transport sector related project, buildings, milling, mining, markets, bakeries and associated activities, which may impact negatively on the environment, human health and socio – economic wellbeing of the people who interact with such projects. Today, the National Environment Management Authority (NEMA) coordinates all environmental activities in Kenya.

2.1. Waste Oil generated Through Importation and Shipment

Petroleum fuels constitute the main source of commercial energy in Kenya.[69]Kenya currently imports all its petroleum products, which was almost 600,000 tons in May 2015[70] from the Middle East countries. These volumes include those for countries such as Uganda, South Sudan, Rwanda and Burundi as well as parts of Tanzania.[71]

Products get to the country through sea vessels such as ships and marine pollution would be as a result of accidental spills About 20% of sea pollution is from deliberate dumping of oil and other wastes from ships, accidental spills and offshore oil drilling. The discharge of oily engine wastes from day to day shipping operations is the most harmful because it happens more often. [72] The UNEP Regional Seas Programme identified ship generated Marine Pollution, oil spill preparedness and port reception facilities for waste as one of their priorities.

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[69] ibid

[70] Reuters: Energy; Kenya oil product imports likely to hit record, offset tepid Asia demand. By Jessica Jaganathan. Tuesday May 12th 2015.

[71] *ibid*

[72] UNEP; Working with Regional seas at www.unenvironment.org/explore-topics/oceans-seas/what-we.../working-regional-seas.

Ships and other vessels which use the port use large amounts of lubricating oils generate quite a large amount of lubricating oils and greases can lead to generation of large amounts of waste oil. These vessels are normally equipped with collection tanks to retain oil, grease, diesel engine accumulated during the ships operations. Tank washings including marine wastes collected can generate large volumes of waste with large amounts of oil.[73]

2.1.1. Legal and Institutional Framework

Importation of Petroleum in Kenya is done through the Open Tendering System (OTS) facilitated by the Energy Regulatory Commission (ERC), which gives licences to petroleum companies that win tenders for importation of refined petroleum products.[74] These refined petroleum products are brought into the country through the sea on ships. The process is governed by rules provided for in the Petroleum Act of 2006, which binds and give responsibility both the owner of the ship and the owner of the petroleum products with regards to any liability arising.

The United Nations Law of the Sea Convention, of which Kenya is a signatory to, gives provisions on the preservation and protection of the marine environment. Article 194 (3 (b)) gives provision for states to take measures to deal with sources of pollution of the marine environment to fully minimise pollution from vessels which may arise form accidents, intentional and accidental discharges as well as regulating the construction, design, [75]

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[73] Further guidance on Basel Convention regulatory frameworks can be found in the following documents: Model National Legislation on the Management of Hazardous Wastes and Other Wastes as well as on the Control of Transboundary Movements of Hazardous Wastes and Other Wastes and their Disposal (UNEP, 1995a), Basel Convention: Manual for Implementation (UNEP, 1995b) and Basel Convention: Guide to the Control System (UNEP, 1998a). Parties to the Stockholm Convention should also consult Interim guidance for developing a national implementation plan for the Stockholm Convention (UNEP, 2003)

[74] Ibid.S.102

[75] **United Nations Convention** on the **Law of the Sea** of 10 December 1982.

There are cases where institutions mandated to supervise, exercise authority and take action on polluters concerning oil spills invoke their powers. In a reported incident in April 2005 where an Indian tanker spilled 140 metric tons of crude oil in the Mombasa harbor. The accident happened when the tanker hit a metal rail as it docked which lead to puncturing of the hull creating a slick with a radius of 2km. [76]

In this incident, the NEMA Deputy Director stated that action would be taken which included invoking sanctions with regards to the International Oil Pollution treaties which Kenya was a signatory to that would guarantee compensation. He further stated that the compensation would be used to fund the clean up the near-shore ecosystems and confirmed that the slick had been contained and was not spreading. The Indian ship that caused the slick had also been detained at the port of Mombasa and conditions for its release were only once a bank guarantee of $13,000 had been given by its owners.[77]

The other regulation is the Kenya Maritime Authority (KMA) established under the Kenya Maritime Authority Act, 2006 whose main objective being to regulate, co-ordinate and oversee maritime affairs. That include coordinating oil spill response plans /drills and managing the national marine oil spill response contingency plan, keeping records of oil spill incidents as well as records of costs relating to responding to oil spills. The KMA whose mandate also includes conducting pollution inspections on the Kenyan ports and other navigable waterways. This is clear in an incident where there was an oil spill at a popular beach on Mombasa that caused panic among conservation experts as well as marine officials in January 2013. [78]

The origin of the spill was suspected to have been from a leakage from a ship or was as a result of illegal siphoning from one of the vessels that had anchored at the sea. Despite KMA being

[76]News.bbc.co.uk – Kenya seeks money for oil spill. Reported on Tuesday 12th April 2005, 13:00hrs
[77] ibid
[78] Panic after massive oil spill at Mombasa beach; Reported by Philip Mwakio on Thursday Jan 31sy 2013 at 10:13. www.standard media.co.ke

in the location, the origin of the spill was not established. This goes to show that despite the existence of a regulatory body, lacks of resources and technical expertise leads to non-performance of its functions effectively.

The spill was reported to have been detected by fishermen during fishing who stated the layer of the oil stretched for close to 200 metres along the beach into the sea this and the extent of the spill was not confirmed by any KMA official. It took more than 48 hours for the spill to be contained.[79] Despite oil samples being collected at the beach for purposes of establishing the origin,[80] there has been no further report on this incident.

The lapse on the part of the regulatory bodies mandated with marine protection in exercising their authority in protection of the marine form waste oil and other forms of pollution by vessels as well as lack of means to monitor spills through inspections of the vessels that anchor at sea, is seen.

It further shows that the National Marine Spills Pollution Contingency Plan is not in use. This plan was developed in 2009 through the KMA Act of 2006 and is managed by Kenya Maritime Authority. The aim of the plan was to have measure in place to reduce the impact on marine pollution caused by vessels[81] but there are no reports on the effectiveness of the plan or if indeed this plan or its effect to reducing marine pollution by vessels transporting petroleum products is effective.

The proposed Bill on the Prevention and Control of Marine Pollution by the current Cabinet Secretary of Environment to curb marine pollution by oil companies, ships and offshore drilling firms through oil spills of any kind i.e. accidental or intentional is aimed at harmonising the

[79] ibid
[80] ibid
[81] Oil Spill Contingency Plan Marine Kenya; by John Oyuke, standard News Study; Thursday 4th September 2014.

Kenya Seas Laws with the Kenyan Constitution, International Conventions and Treaties on Marine Pollution.[82]

This goes to show that there should be reforms on the current laws to place responsibility on ship owners as well as companies that carry out off shore drilling to comply with the already laid down standards for carrying out their businesses without polluting the environment and if their actions lead to pollution then the Polluter Pays Principle would be applicable.

It is a requirement by the law that any company engaging in bunkering business on Kenya's waters or imports more than 150,000 tons of oil per year to contribute towards the International Fund for Compensation for Oil Pollution Damage at a rate determined by the Director General of the Kenya Maritime Authority (KMA).[83] Bunkering business entails storage of petroleum products in tanks and the business of re-fuelling ships. These business operations are carried out at the seaports.

The MARPOL Convention is an International Agreement for the protection of the marine environment for prevention of pollution from ships by oil and other harmful substances. It binds countries with seas and Kenya is a party to this convention and therefore bound by the regulations.[84]

With the Marine Pollution (MARPOL) Convention cleaning and maintaining of the compartments of the tankers is a requirement of the vessels and an obligation for operators to uphold environmental standards. During the cleaning of tankers that have carried refined oil, part of the residue oil is pumped out at sea through the Oil Discharge Monitoring and Control System (ODMC). Tankers that have been used to carry crude oil are cleaned using the Crude

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[82] Laws planned to curb marine pollution by oil companies and ships. Business Daily, Pg. 17; 3rd December 2014 Article by Kiarie Njoroge

[83] ibid

[84] The **International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978(MARPOL 73/78, MARPOL** is short for marine pollution and 73/78 short for the years 1973 and 1978) is one of the most important international marine environmental conventions.

Oil Washing process (COL) which involves using pressurized crude to clean the tanks then water is sprayed to remove any residues. This is allowed by MARPOL Regulation 33 for tankers of 20,000 tonnes or more.[85]

Oil spills and other forms of oil wastage in Kenya are a general concern especially spills at the ocean and shoreline have made marine experts in Kenya weary and express concerns over the pollution and hazardous effects that arise from the spills. In 2005, Kenya was compensated an amount of USD 1 Million after an Indian oil tanker MT Ratna spilled oil which spread to the country's shoreline causing environmental and property damage.[86]

There are other industries that rely on petroleum products. They are bound by the Constitution, EMCA, OSHA and other acts with regards to conserving the environment and minimising activities that would lead to pollution. By the nature of these industries, waste oil is generated. There is an effort seen from some institutions as well as business owners to manage pollution issues. In an incident that happened at the port of Mombasa at the KenGen's Kipevu diesel Station where it was reported that at least 10,000 litres of oil leaked to the beach and lead to the death of animals and destruction of vegetation. The spill was because of a fuel transfer pump that failed to stop, causing an overflow of the diesel.[87] This happened when the fuel was being pumped to the station. With the efforts of KPA and KPRL the situation and spill was contained. A statement was released by KenGen stating that the spill had been controlled and they were monitoring any impacts that may result so as to prevent future spills. They proceeded to clean up the affected area by skimming which involved separating the oil from the water then pumping the water back to the ocean. It was estimated that 7,000 litres spilled over but

[85] ibid
[86] 'Pollution experts push for oil spill rapid response plan' Business daily of Dec 9, 2009.
[87] The Daily nation, Oil-spill_threatens-marine-life; Reported by Mathias Ringa on Monday January 30th 2012 at www.nation.co.ke/news

3,000 was recovered during the skimming exercise. Oil spill Mutual Aid Group (OSMAG) also assisted to remove the oil and prevent further damage to the ecosystem. [88]

OSMAG a group that was formed in 1996 by the major oil companies that include Oilybia, shell, KenolKobil and Total to respond to oil spills in the Kenyan waters. The organisation operates and integrates member's efforts with the relevant government bodies and maintains links with local, international and private organisations. Members of the group have an obligation to have an oil spill safety plan and always maintain oil response equipment that is regularly maintained and can be used.[89]

Membership of OSMAG is mandatory for Petroleum business operators specifically the oil marketing companies. A valid membership certificate is a mandatory requirement with the ERC for renewal of the annual trading licence.[90]

It is important for employers to ensure as reasonably possible as they can that the environment their employees are working in including machinery and equipment are safe and do not pose a health risk. They should provide where necessary protective clothing and basic first aid equipment to deal with emergencies and situations.

Effects of oils spills have a wide impact that is long lasting to the environment affecting its useful ness and the organisms that depend on that environment. Marine oil spills that happen in the oceans and shorelines. Recovery of the environment can be natural or through well conducted clean-up processes and restoration measures. Marine life is threatened by oil spills this could lead to some marine life and living organisms becoming extinct either through death or inability to reproduce.[91]

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[88] ibid

[89] The **International Tanker Owners Pollution Federation** (**ITOPF**) has responded to over 700 incidents involving oil or chemical spills worldwide www.itof.com

[90] Energy Act 2006 Sec 80

[91] .Daily Nation.30 January 2012: Kenya: Oil Spill Threaten Marine Life.

There is also an economic effect caused by spills through ships which is also large especially in the Coastal areas which largely affects the environment as a whole including, the water, fish, birds, sea plants and weeds. The costs incurred to restore through clean-up activities are serious economic losses which have been experienced by industries, individuals and communities who are dependent on coastal activities and resources for their livelihoods.

This also affects the tourism and fisheries sectors which are most affected as well as other businesses that are affected by disruptions and loss of earnings. Tourism and human as well as marine life are greatly affected at the Kenyan Coast due to the long term effects of a spill.[92]

Effects of oil spills on the human health are far reaching as well as have long lasting effects on the psychological, physical, social and economic effects on those affected. The Institute Of Medicine (IOM)- USA identified respiratory which are short term effects as well as neurological or nerve affecting which are long term as well as skin affecting disorders as resulting from weathered oil products and general exposure to oil products for a certain duration. [93]

The results and effects of oil wastage are harmful to the environment both the offshore and inland are harmful and disastrous and they should be available avenues to address accountability and responsibility to those found liable for oil wastage. This will result in reduced oil wastage and environmental harm.

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[92] Panic after massive oil spill at Mombasa beach, The Standard Published Thu, **January 31st 2013** at 00:00, Updated

[93] Margaret. A. McCoy & Judith A. Salerno (Rapporteurs): Institute of Medicine of The National Academies "Assessing the effects of the gulf of Mexico Oil Spill on Human Health" page 43-44: A summary of the June 2010 Workshop (2010) National Academies Press, Washington DC

2.2. Bulk Transport through the Pipeline

Transportation of the products can be through pipelines which are considered the safest and cheapest means of transporting petroleum products which serve various networks of pipelines carrying petroleum products to different depots.[94] The risk in using pipelines is that they can rapture or leak discharging their contents into the environment and causing pollution. The pipeline may leak due to wear and tear, corrosion, cracking and it may rapture due to excessive pressure during movement of products, earthquakes or damage during excavation The American Petroleum Institute (API) gives guidelines for integrity and management of pipelines to be observed some of them include; conducting pressure tests of the pipeline, installing a pipeline monitor, pipeline leak detectors, qualified pipeline personnel as well as conducting public awareness programs.[95]

The two main oil receiving depots or terminals in Kenya, Kipevu and Shimanzi Oil terminals situated at the port of Mombasa serves as the key port or entry point of bulk fuel imports that are for local as well as export use.[96] The Kenya Petroleum Company Ltd (KPC) operates the pipeline in Kenya that runs across Kenya from Mombasa to Nairobi then to the western parts of the country namely Nakuru and Eldoret.

2.2.1. Legal and Institutional Framework

The National Environment Management Authority (NEMA) established under the Environmental Management and Co-ordination Act No. 8 of 1999 (EMCA) is the principal instrument of the Government with authority to implement all policies relating to the environment. NEMA is mandated to exercise general supervision and co-ordination over all

[94]Olorunmaiye,J.A& Obadote, D.J , 2009. Conference: 'Computation of the quantities of Oil spilled from Pipelines'. University of Ilorin, Nigeria.

[95] Since 1924, the American Petroleum Institute has been a cornerstone in establishing and maintaining standards for the worldwide oil and natural gas industry.

[96] The Star.co.ke, 03 September 2015, Plans for new Kipevu Oil Terminal on course

matters relating to the environment and to be the principal instrument of the Government in the implementation of all policies relating to the environment[97].

Among its other mandates includes management of disposal of hazardous wastes such as used oil[98] in relation to the petroleum chain from source until disposal.

The Environment Management and coordination Act (EMCA), regulates the discharge of hazardous substances, chemicals, oils or mixtures containing oil into any waters or the environment. [99] The Energy Act provides that anyone who pollutes the environment through their activities is responsible and liable at their own cost to clean the environment, water bodies and to restore it to its original state.

The case of ***Gidion Mbuvi Kioko V Attorney General &6 Others (2012) eKLR***[100] was instituted as a result of a spillage that occurred from a pipeline owned by KPC running through the slum Mukuru- Sinai in an industrial area of Nairobi, as slum dwellers were collecting the spilled oil when the pipeline exploded and a fire broke out. It resulted to the 120 people losing their lives and hundreds being injured. The claim was for negligence on the part of the defendants for constructing an oil pipeline in the middle of the slum without putting adequate fire equipment in place and failing to uphold their statutory duties. The respondents claimed they did not bear directly responsibility for the fire and that the victims failed to show they had breached their duties under the law.[101]

This suit illustrates the responsibility that petroleum business operators have to ensure that they conduct their businesses in a manner which causes minimum or no pollution by engaging in

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[97] EMCA 1999 Sec 9
[98] Legal Notice 121 Environmental Management and Coordination (Waste Disposal) Regulations of 2006
[99] Section 93, EMCA
[100]High Court Petition No. 223 of 2011
[101] https://Business-humanrights.org/en/kenya-pipeline-company-lawsuit-re-explosion-fire-in -Nairobi

practices and that protect the environment and that the polluter pays principle would apply wholly to them.

The Way leaves Act provides for the construction of pipelines subject to impact assessments being carried out before issuance of development and construction permits are issued. [102] The Physical Planning Act should in the same breadth provide that such areas should be free of human or animal due to the risk involved.

KPC had further issued the dwellers with a notice to vacate the area due to the related risk of living and conducting business on top of a pipeline.[103] KPC safety department staff blamed the slum dwellers for lighting fires and illegal electric connections

In December 2015, residents of Kibwezi East in Makueni sued the Kenya Pipeline Company (KPC) in the case of ***Alice Muthike Maingi and others V Kenya Pipeline Corporation and National Environmental Management Authority***[104] seeking compensation for an oil spill that contaminated River Thange and its environs. The residents in a petition filed at the Milimani High Court accused KPC and National Environmental Management Authority (NEMA) of negligence, arguing that the institution ignored calls from villagers reporting burst underground pipes for over five months. The leak occurred in May, leading to the spillage of more than 400,000 liters of oil products. Residents claimed some of them suffered from lead poisoning and loss of livestock and crops to diseases after the spill that affected the water and soil. The Kibwezi oil spill was because of an accidental leak from a damaged section of the KPC pipeline, which resulted in the pollution and contamination of water and land. After the spill, KPC took measures to clean the affected areas that included the river and soil around the riverbed as well as a cleansing ceremony to 'appease the gods.'

[102] Wayleaves Act Cap 259, 2010.
[103] Business Daily (Nairobi) 11 September 2011: The Sinai Fire Tragedy, KPC issues warning
[104] High Court Petition No. 526 of 2015

From the case of Alice Muthike Maingi, it is seen that negative effects of waste oil to the human health pose a number of health risks to both animals and humans such as drowsiness, nausea, fatigue, numbness in the feet, headaches and paralysis have been associated with exposure to wastes containing hydrocarbons.[105]

Oil which is insoluble, toxic and persistent in nature because of its additive and metals composition would be a major contamination of ground water if indiscriminately disposed or if it comes into contact with water. The Environmental Management and Coordination (Water Quality) Regulations 2006 provide the effluent discharge for grease and oil is zero because impacts of oil in drinking water can be devastating.

Impact assessment and regular annual audits are important as provided for in The Environmental Impact Assessment and Audit Regulations of 2003 when handling facilities that handle hazardous product as this will help with early detection of any leaks or anomaly in the piping system that can be rectified.

Protection of the environment and water sources like rivers from pollution through toxic and hazardous wastes is prohibited under the Environmental Management and Coordination (Water Quality) Regulations of 2006. The Regulation also encourages protecting and improving the quality of water and avoiding pollution is one such way. There should be measures put in place to remedy pollution by hazardous and toxic substances which affect the quality of water especially through accidental acts.

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[105]Sawe J.J and Neyole E.M (2013), *Petroleum Management Practices and their Potential Impacts on the Environment and Human Health in Kenya, 5:2 I* International Journal of Disaster Management and Risk Reduction http://www.journal.a.dmcrk.com/study5212.pdf (accessed 29/06/2015)

The recent oil spill in Taita Taveta that was caused by KPC on 17th December 2016 which occurred through a burst on the pipeline spilling large volumes of oil into the villages and affecting about 150 of them. The oil spill spread to the farms which resulted to the crops being destroyed and their fruits vegetables drying. The villages also stated that their health had been affected and they were experiencing respiratory diseases that included asthma, coughs and flus. Learning in the nearby schools had also been affected as well as the main income generating activity for the villagers, which is farming had been affected due to the trail of destruction caused on the farms and to the crops.[106]

KPC visited the scene and provided the residents with soda and bread but they had no other food because they had been warned against trying to light a fire to cooking because the ignition would cause a fire due to the contaminated soil.[107]

The issue arises as to how and where the contaminated soil and vegetation is handled and disposed of.

2.3. Bulk Storage

This is the storage of petroleum products in large quantities of a capacity of more than five hundred gallons[108] in a depot or storage facility. Spills at the depots can be caused during operational procedures such as during loading of tanks using the hoses or from leaks from the pipes, which would not be easy to detect and would lead to serious and even fatal incidences. The Sinai fire tragedy that led to loss of life illustrates the harm and effects of underground leaks from the pipes at the depot that were not detected and hence were not actioned on..

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[106] Oil Spill is killing us, Taita-Taveta residents tell Governor Muruttu. By Benson Mnyamwezi, Saturday 28th January 2017 www.standardmedia.co.ke

[107] ibid

[108] Petroleum Rules Part 1 section 2

2.3.1. Legal and Institutional Framework

Once the petroleum products are imported, they are transported through the pipeline by the Kenya Pipeline Company (KPC), which also stores the products in its depots as well as transports the products to different storage facilities or fuel depots belonging to the oil marketing companies. Some of the oil marketers both local and the multinationals have petroleum storage facilities or depots where they store their products. A license to operate such a facility is issued by the ERC.[109] For oil marketers who do not have depots, they enter into 'Hospitality Agreements' where their products are stored and managed for them by their 'hosts' and they pay a hospitality fee. Both parties are bound by the terms of the agreement.

In the case of Kenya Ports Authority V East African Power & Lighting Co. Ltd1982, KLR pg 410[110]In this case the respondent had been given a license by the appellant to operate a power station on the appellants land in the port of Mombasa. There was a leak from the pipes serving the power station, which lead to the waters of the port being contaminated with oil. The appellant sued for damages that were incurred to clean the harbour which as he stated in his plaint were done so as to avoid combustion of the oil.

In this matter the court held that the pollution damaged the port waters are not the property of the appellant. The court further considered the port waters to be *res nullius* meaning they did not belong to anyone and not capable of being owned and therefor the appellant did not have any *locus standi* to sue. The respondent was further compelled by the court to clean the port and bear all costs relating to the same. In this case, we see the courts putting responsibility on the pollutants to restore the contaminated environment to its original state and applying the Polluter Pays Principle.

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[109] Energy Act, 314 Rules

[110] Kenya Ports Authority v East Africa Power & Lighting Co ltd, Civil Appeal No. 41 of 1981. Court of Appeal, Mombasa, 9 March 1982

2.4. Retail Transport by Oil Tankers

Transportation of oil can also be by use of road tankers. Spills can occur during loading and offloading of products which takes place in ports and oil terminals. Spills form these are seen as equipment and structure failures as well as personnel failures. The equipment and body structure of the tankers should be properly maintained and frequently inspected. Personnel should be properly trained on loading and offloading procedures and proper clothing and protective wear provided to them.

Licensing of petroleum products through road transport is provided for in the Energy Regulations of 2013[111] also sets out the process for applying for a license as well as the prescribed time lines for the tankers to be driven on the roads which are between 6:30 am and 6:30 pm.[112]

2.4.1. Legal and Institutional Framework

The ERC regulates the transportation of Petroleum into the country. A vehicle used to transport petroleum is required to have valid petroleum permit issued by the Commission or by agents appointed by the Commission.[113] The driver of the vehicle has to be certified to transport petroleum products. It is an offence to contract a driver who is not certified to transport petroleum. The penalty of contravening this, is a fine not exceeding one million shillings, or imprisonment for a maximum term of one year, or both.[114]

The Energy (Licensing of Petroleum Road Transportation Business) Regulations, 2013 provides for certification of tanker drivers who undergo professional training on emergency preparedness, defensive driving and knowledge on petroleum. The latter certificates are renewable every year. The regulations require permits for tankers used in the transportation of

[111] Energy (Licensing of Petroleum Road Transportation Business) Regulations 2013 Part II, Sec 2-7
[112] Energy (Licensing of Petroleum Road Transportation Business) Regulations of 2013 part II, Sec 8(K)
[113] Energy Act No. 12 of 2006, Revised 2012, Cap 314 s.80(3)
[114] Ibid.S.80(4)

petroleum; the permit is renewed annually as proof that it meets the specifications set out by KEBS.

ERC drafted new regulations on the requirement of drivers transporting petroleum products, that they should have a valid licence issued by ERC. This was in consultation with partner institutions that include KEBS, NEMA and the service station owners to ensure certain standards are met and complied with.[115]

Licensing requirements under the Energy act of 2006 include licensing of the drivers. The Act also gives the ERC authority to issue, modify, renew, revoke or suspend licenses issued for activities in the energy sector including petroleum businesses.

The regulations require both the new and existing truck drivers transporting hazardous materials to undergo special training programme and after passing, it would be issued with an ERC certificate that is renewed annually. Under the previous regulations, anyone was allowed to drive hazardous materials and oil tankers if they possessed the heavy commercial vehicle driving licence.[116]

Despite the regulations being in place and mandating certification of petroleum tanker drivers, there is still a gap on implementation by petroleum tankers to facilitate their drivers to attend and go through the relevant trainings[117] as provided for in the amended Energy Act, which prohibits any person to drive a petroleum tanker without a valid certificate issued by the ERC.[118]

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[115] Business Daily Africa; Kenya to set new rules on Petroleum Transportation. Friday, May 3, 2013 (By Xinhua)
[116] Allafrica.com/stories/2014: Kenya Tightens Rules to Curb Oil Tanker Accidents. 8 January 2014; by Julius Kithuure
[117] Energy Act No.12 of 2006- Legal Notice No.8 Part IV (15)– January 2014
[118] ibid

The Directorate of Occupational Safety and Health Services which was established as a department within the Ministry of Labour and East African Community Affairs, whose primary objective is to ensure safety, health and welfare of all workers in all workplaces as well as promote safe and healthy work environment to avoid accidents, spread and contracting of diseases and environmental pollution.[119]The department is also mandated to implement all rules pertaining to the protection and prevention of workers from occupational hazards and ensure a safe working environment. This includes petroleum tanker drivers who carry and engage in services related to transporting hazardous products. The Directorate is the one responsible for the implementation of Occupational Safety and Health Act of 2007.

The directorate has not been publicly seen to be working closely with the ERC on it with regards to compliance of tanker drivers and this may lead to issues with regards to protection of the drivers and their working environment which would include having basic training for the drivers. During the interview with the ERC official, he confirmed that most tanker owners are not aware of the licence requirements that the drivers should undergo training with the commission and be certified to drive oil tankers. The few that are privy do not adhere to this requirement either and both the third and fourth respondents confirmed that despite the regulations being in place, compliance was lacking as such the driver licence from ERC had not been given to them by the owners of the tankers. They were only provided with the driver's licence for the heavy commercial vehicles issued by NTSA.

Inspection of the tankers to confirm compliance is provided for under Section 12 of the repealed Petroleum Act of 116. It provides the inspection of the tankers to be done by an authorized

[119]http://www.labour.go.ke/2016-04-14-11-48-28/directorate-of-occupational-safety-and-health-services-doshs.html

licensing authority and personnel. This is to ensure that the fittings/ containers on the tanker are in compliance and not in contravention of the regulations with regards to the transportation of petroleum products by road.[120]

The tragic results of an Oil spill that occurred in Molo (Sachangwan), Kenya on 31 January 2009 when a fuel tanker lost control and veered off the road and overturned resulting to an oil spill that burst into flames, resulted to the death of at least 113 people and about 200 others critically injured. Most of these were onlookers who attempted to collect the remnants of the spilt oil. Rescuers at the scene suggested the cause might have been static electricity, an accidentally discarded cigarette, or an individual who was angered at a police blockade and sought vengeance. [121]

The result of this was loss of human and animal life and destruction of the environment and land. The Land Act provides for the protection of land.[122] The Environment Act also provides for preservation of the environment by petroleum business operators through their actions.[123] The law does not make reference to creating awareness to the public on the dangers and risks involved when petroleum products are exposed to the environment and how dangerous and flammable they are as well as consequences for those found siphoning spilled oil.

An unreported case that occurred on 2 February 2009, two days after the Molo, Sachangwan fire disaster, an oil tanker was involved in an accident along the Nakuru- Nairobi highway residents still thronged the scene to collect the leaking fuel.[124]

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[120] Petroleum Act of 116; Section 10 (1-3)
[121] Daily Nation news study, Sunday 1st February 2009
[122]Land Act 2012
[123]Environment Management and Coordination Act No. 8 of 1999 (EMCA)
[124]Disaster Relief Emergency Fund report on Kenya, fires. 12 August 2009: International Federation of Red Cross www.efrc.org/docs

Though the law provides for acts of siphoning spilled oil as a criminal offence with regards to theft of goods in transit, under the Penal code,[125] there is no enforceability of that law with regards to spills through tankers by the law enforces and the act of collecting spilled oil by residents is not deterred.

Fuel tankers must be maintained and kept in good condition which is satisfactory with the licensing authority. [126]

2.5. Cleaning of Oil Tankers

An oil tanker is a motor vehicle or ship designed to carry petroleum products in bulk on the road or in the sea. It is also known as a petroleum tanker. Tank trucks are large and can be insulated or not, they may be pressurized and designed for single or multiple loads. [127]

Because tankers have large capacities, they are most popular vessel used for transporting oil cargoes due to their large storage area which allows for a variety of products to be transported at once.[128]

The MARPOL Convention is an International Agreement for the protection of the marine environment for prevention of pollution from ships by oil and other harmful substances. It binds countries with seas and Kenya is a party to this convention and therefore bound by its regulations.[129]

With the Marine Pollution (MARPOL) Convention cleaning and maintaining of the compartments of the tankers is a requirement of the vessels and an obligation for operators to uphold environmental standards. During the cleaning of tankers that have carried refined oil,

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[125] Penal Code Cap 63, Section 279 (revised 2014) Laws of Kenya

[126] Section 10 (iii) of the Petroleum Act - repealed Petroleum Act of 116

[127] https://en.wikipedia.org/wiki/tanker

128 Demulsifying At Sea 2: Handling Oil Cargo Residual Waste On Tankers Written by Ryan Anderson on June 1, 2016. Posted in Blog, Clean Ideas, Maritime Industry, Water and Waste Oil Treatment

[129] The **International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978(MARPOL 73/78**, MARPOL is short for marine pollution and 73/78 short for the years 1973 and 1978) is one of the most important international marine environmental conventions

part of the residue oil is pumped out at sea through the Oil Discharge Monitoring and Control System (ODMC). Tankers that have been used to carry crude oil are cleaned using the Crude Oil Washing process (COL) which involves using pressurized crude to clean the tanks then water is sprayed to remove any residues. This is allowed by MARPOL Regulation 33 for tankers of 20,000 tonnes or more.[130]

The Draft Technical Guidelines on Handling, Management and Disposal of Used Oils by NEMA apply to transporters and petroleum tankers provides for maintenance of oil tankers that include cleaning.

The Energy Act of 2006 requires that one who is engaged in transportation of petroleum products should have a valid license issued by ERC. The cleaning of the tankers should be done using environmentally friendly practices and the Recommended International Code of Practice for the Storage and Transportation of bulk petroleum products.

After transportation of the products they are stored in storage facilities designed for storage of hazardous materials that include retail filling stations and bulk storage facilities such as depots

2.6. Conclusion

This chapter, shows that despite there being a legal and institutional framework, there is lack of implementation to manage, coordinate and ensure the laid down regulations are complied with by petroleum business operators with regards to managing waste oil generated through the cycle of their business activities to make them liable for those actions that would lead to pollution and harm to the environment.

[130] ibid

CHAPTER THREE

REVIEW OF THE LEGAL AND INSTITUTIONAL FRAMEWORKS GOVERNING GENERATION OF WASTE OIL AT RETAIL FILLING STATIONS.

3.0. Introduction

This chapter will discuss the next phase which is of the storage of the petroleum products once they have been transported and delivered through road tankers to the retail service stations. Care should be taken when transferring the products into the underground tanks which are the storage facilities at the service stations. The Scottish Environment Protection Agency recommended that waste oil tanks and pipelines should be installed above ground if possible for ease in carrying out check easily as well as identify leaks early during maintenance.[131] Retail filling stations are facilities that sell fuel and engine lubricants to consumers. They have both fuel storage tanks and fuel dispensing pumps

Oil marketing companies make the petroleum products available to the public and consumers at their branded service stations that are in most cases operated by dealers as franchisees through a franchise agreement signed by both the oil marketers as the franchisor and the dealer as the franchisee. The dealer/ franchisee then operates the service station under laid down standards and rules stipulated in the franchise agreement or Marketing License Agreement as they are commonly referred to. Non-compliance to the standards and operation procedures may lead to termination of the franchise agreement.

[131] Pollution Prevention Guidelines: Safe Storage and Disposal of used Oils - PPG8, February 2004

This chapter will discuss how waste oil is generated from the operations at the retail stations including the service bay or vehicle maintenance bay as well as the extent which the legal framework is involved in ensuring the waste oil is managed in an environmentally sound manner.

3.1. Underground Storage at Retail Filling Stations

The repealed Petroleum Act Cap and the Energy Act of 2006 provide that anyone operating a retail filling station in Kenya should have a trading license that is renewed annually. A storage license is required for those storing and dispensing petroleum products of any kind in their facilities. This is to manage and ensure that those engaging in this business do it in a way that preserves the environment with minimal pollution and degradation to the environment through their operations. There are certain measures that need to be put in place by the petroleum business operators through the issuance of the license that are aimed at minimizing oil spills and unsafe waste oil disposal practices. Petroleum business operators must obtain a trading license for these kind of businesses and related legal documents to ensure proper approval has been given. This is provided for under the repealed Trade Licensing Act,[132] which provides for any business operators to have a trading license.

The retail filing stations have tanks that are installed for storage of petroleum products. The tanks should be less than 20 years old[133] otherwise they have a high potential to leak. The tanks should be either single skinned steel tanks surrounded by concrete which helps to delay the release of the leaked product to the environment or the tanks should be double skinned. Recommendation is also for the tanks to be made of fiberglass.[134] The space between the skins

[132] Trading Licensing Act cap 497 Section IV
[133] KEBS:KS 1969 (2006): General Guidelines to Prevention of Pollution Guidelines Part 12
[134] KEBS:KS 200 (2002); Specifications for storage tanks for Petroleum Industry

acts as a detector in case of a leak. The Technical Guide notes also provide for leak and spill detection systems. Storage facilities whether underground or above the ground should be able to withstand the qualities such as expansion of petroleum products. Service station employees should be well trained and informed on offloading procedures, refuelling procedures as well as handling of hazardous substances including using protective clothing.

There are daily procedures that are meant to be done at the station to help detect if there are potential leaks in the tanks. Daily dipping which is a process where the petroleum product levels are checked using a dipstick which is a marked wooden stick that is dipped into the underground tanks to determine the oil levels vis a vis the sales for the day. This process should be done twice a day and at each time, the oil levels are recorded and measured against the sales for the period.[135] This method helps the petroleum business operator in this case the franchisee to know if there are any abnormalities in his tanks. If the levels are lower than his sales for the day for a repeated period of time, this would raise a red flag on the integrity of the underground tanks, pipes or the dispensing pumps.

Kenya Bureau of Standards (KEBS) also has laid down specifications with regards to installation of underground storage tanks, fuel pumps and dispensers and pipe works at the stations.[136] Provision for carrying out impact assessments are mandatory checks that are a pre-requisite condition before constructing retail filling stations. Thereafter, annual audits after installation of the station should be conducted and records kept. This is a provision in the Environmental Regulations of 2003.[137] This would all be with the aim of detecting any anomalies that include spills or any oil detection.

[135] General Guide to Prevention of Pollution Guidelines, Part 16 (16.7)
[136] KEBS: KS ISO 11439:2013- Petroleum standards for underground tanks, pumps and pipe works.
[137] Environmental Regulations of 2003, EMCA Section 147

These periodic audits act as checks for the business operators in detecting leaks in the underground tanks early enough as well as leaks that could occur on the underground pipes that would lead to environmental pollution. Despite the emphasis of the same through the EMCA of 2009, that requires businesses involved in the management of hydrocarbons including storage of combustible and explosive fuels and any other facilities should undergo environmental impact assessments prior to their operations.[138]

NEMA one of the institutions that should carry out the random or pre-planned checks to confirm compliance by petroleum business operators, lacks the muscle in form of manpower to execute and ensure compliance, this was stated by the first respondent interview. This was further confirmed by the fourth respondent that in most cases this checks are carried out when there are anomalies such as unexplainable fuel losses in their business operations. In this case a number of tests are conducted that would determine if there are leaks from the underground tanks or fuel dispensing pumps.

Specifications for putting up the filling stations must be complied with in accordance with the Physical Planning Act Cap 286 provides for approvals of site plans for any filling station facility through the local authority.[139] KEBS also has standards that must be complied with for retail filling outlets.[140]

According to Kenya Bureau of Standards' (KEBS) guidelines for construction of petrol stations, service stations, fuel filling points should be located to allow for tankers to maneuver easily within the service stations and to be contained with sealed sumps so that in the event of a spill during offloading process at the fill points, the spilled product will be contained within the sumps and this will prevent spills soaking directly into the ground causing contamination.[141]

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[138] EMCA 1999, Schedule II
[139] Physical Planning Act 2010 (Revised edition 2012)
[140] KEBS: KS 2506: 2014 – Kenya Standard- Petroleum facilities
[141] Kenya Bureau of Standards, KEBS Service Station guidelines

At the retail stations, the dealers who are also employers should ensure that the environment is free of oil spills and they are cleaned off to avoid situations that would lead to injuries and claims on the grounds of negligence like in the case of Purity ***Wambui Murithii vs, Highlands Mineral Water***[142] here the appellant sued her employer for injuries on her pelvic bone, left elbow, left knee and lower back that she sustained while on duty. She slipped and fell on her back while cleaning the production section of the plant, claiming negligence on the part of the respondent for failing to take reasonable precaution to ensure safety at work. The appellant slipped and fell due to oil that had been leaking for eight months from a particular machine since its installation. She further faulted the respondent for failing to provide her with protective clothing and for not managing the leak.

Employees who work in environments where there is collection, transportation and disposal of harmful waste substances should be provided with suitable personal protective equipment while at work. They must also be trained and adequately informed on handling chemicals and hazardous products while at work. This includes procedures to be followed in the event of spills or leaks that could accidentally occur.[143]

Judgment in this case was entered and liability was equal for both the appellant and the respondent because as much as the respondent should have provided the correct safety and protective clothing for the appellant and repair the leak which had been spilling for eight months, the appellant was also held responsible for not ensuring she was working in safe area. Personal protective equipment should be given to workers who handle the waste to protect them from respiratory, skin and other complications associated with handling toxic and

[142] Purity Wambui Muriithi v Highlands Mineral Water, Court of Appeal No. 58 of 2014
[143] Occupational Safety and Health Act No. 15 of 2007(revised edition 2010); Hazardous Substances Rules, 2007 No. 60

hazardous wastes.[144] Safety equipment such as fire extinguishers shall be maintained and conspicuously displayed[145] and within reach at facilities that generate hazardous wastes. Training of persons in the correct use of equipment such as fire extinguishers is important.[146] The factories and other Places of Work Act provides for the health, safety and welfare of persons working in factories and other places and provides that measures should be taken to protect employees on management of hazardous and non-hazardous wastes which may arise or be generated in the operations at the facility.[147]

It is also important that operators of the equipment at service stations are taken through medical evaluations due to the exposure to hazardous and toxic substances. Medical evaluations should be carried out regularly.[148]

An inventory of all Material Safety Data Sheets (MSDS) for the chemicals stored in the workplace should be maintained and all containers containing chemicals should be labeled appropriately as indicated in the MSDS for that chemical as well as training of employees on the hazards related to handling the products done. This is provided for in the Hazardous Substance rules 2007, Legal Notice No. 60.[149]

KEBS in conjunction with the other institutions such as NEMA should ensure compliance by service station owners but because there are no checks carried out compliance levels are low. This was confirmed by the first respondent. He further stated that if the checks were done as often as they should, it would help in early detection of leaks from the pipes or tanks.

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[144]High Court Petition No. 223 of 2011
[145] Occupational Safety and Health Act, 2007, Section 81 (1)(a)
[146]*Ibid* Section 81(1)(b)
[147] The factory and Other Places of Work act, Cap 514 (Revised 1990)
[148] Medical Examinations Rules 2005, Legal Notice No.24
[149] Environmental Regulations of 2003, EMCA Section 147

Oil spills from underground storage tanks can be detected by conducting tests on the equipment that store hazardous products. The tests conducted would be on the underground storage tanks and fuel dispensing equipment. Calibration tests can also be carried out periodically for example bi-annually or annually as provided for in the weights and Measures Act.[150] These tests will help detect underground leaks and mitigate from environmental degradation.

The retail service stations must also comply to the laid down designs and specifications for the fuel dispensing area, offloading area and the service bay areas that include the areas must be paved with Portland cement. This is to minimize runoff of grease, oils and any spilled petroleum products from coming into contact with the stormy water system.[151]

Duty and obligation is given to petroleum business operators to avoid degradation of water sources. The Water Act provides for protection of water sources by constructing sewers, drains, interceptors to avoid degradation of water sources by the business operators.[152] An Industrial Waste Discharge Permit is required for this.[153]

Third schedule of the Environmental Management and Coordination (Water Quality) Regulations of 2006, provides for installation of pollution prevention systems that include an oil Interceptor or oil-water separator where wastewater is contaminated with oil and grease.

ERC has given technical guidelines on designing and operating oil-water separators or inceptors so as to separate oil and water at filing stations to avoid pollution by oil into the water sources.

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[150] Weights and Measures Act, Cap 513
[151] General Guidelines to Prevention of Pollution Guidelines Part 9
[152] Water act, 2002 Sec 73
[153] *ibid*

The standard for grease and water was set while taking into account that a major portion of the Kenyan population drinks water directly from water sources and therefore the need to protect them. Water contaminated with oil is also very dangerous to human health.

Responsibility to ensure this has been complied with regards to retail stations lies with NEMA, ERC and KEBS to protect water pollution that would cause harm to the human health. Contaminated oil is also harmful to the environment and measures should be taken to ensure the storage tanks meet the given specifications as set out by ERC in their Technical Guidance Notes which provide for specifications of storage tanks.[154]

The lack of constant oversight by the regulator (KEBS) as has led to the possibility of inconsistent levels of performance and laxity by retail filling station owners with regards to service station requirements specific to underground storage tanks. [155]

Failure of the institution on implementation and scrutiny can be seen in the case of ***Republic V Attorney General &2 Others Ex-parte Joseph Shiroko*** where complaints were made regards to supply of sub-standard petrol. The owner of the station then went to court to have the closing of his station stopped and declared unconstitutional.[156] The facts set out in this case clearly show a weakness in the implementation on checks and inspections as should be done by KEBS and ERC with regards to service stations

The filling stations have their own spill contingency plan, which involves the use of sand buckets. These sand buckets are normally stored near the fuel dispensing pumps, and the sand is used in the event of an oil spill or oil leak to absorb the oil mostly caused from the pumps either due to over dispensing of the product or a fault in the piping of the pump. The sand soaks

[154] ERC- Technical Guidance Notes TGN/1.5 sec 9.12- Design, Commissioning, Decommissioning and Recommissioning of Petroleum Retail Service Stations – June 2016
[155] Ibid.
[156] Republic vs Ag & 2 others Ex-parte Joseph Shiroko (2015) eKLR

the oil and prevents it from spreading or causing any other harm. The contaminated soil is then collected and placed in a sand pit and is collected for disposal. Where and how the contaminated soil is disposed of is unknown.

3.2 Vehicle Maintenance/ Service Bays

These are repair shops where automobiles or vehicles are repaired and maintained. They are also known as garages. Automobile vehicle garages use lubricating oils, paints, fuels body fillers and other toxic substances in the course of their businesses. Waste oil is generated from activities that include cleaning of the vehicle parts that include draining and replacing of engine oils and greasing, paint works. These are processes that take place at even manufacturing industries. The waste oil generated is capable of causing environmental pollution due to the toxic metals contained if the waste is not handled at source and if the waste is not properly disposed of.[157]

According to a study carried out in Kitale Town[158]waste oil constitutes a big percentage of the amount of liquid waste generated by most urban towns in Kenya. In the study, the 17 petrol filling stations and 76 small-scale garages, which comprised the sample of the study, generated approximately 582.86 litres and 1,845.71 litres of waste oil per day for the garages respectively. In terms of disposal, the study established that marketers sold ninety percent of their used petroleum oil to local vendors while the remainder (10%) was disposed of in soak pits.[159]

Out of the waste oil generated by the garages, only a mere forty-four percent was being sold to local vendors for timber and wood curing while the rest was indiscriminately discarded to the

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[157] Mutuku, S.M. (2013), Lead, Cadmium and Zinc Speciation in Garage Soils, Their Levels in Kales and Water along Katothyani Stream, Machakos Town, Kenya School of Pure and Applied Sciences, Kenyatta University.
[158]Kungu M.D. and Simiyu G.M (2012) "The challenges of oil waste management in Kenyan urban centres: A case of kitale town," 4:1 *International Journal of Current Research*, pg 276-280, at http://www.journalcra.com/sites/default/files/1190.pdf (Accessed 28/06/2015).

[159]*ibid*

environment.[160]The filter waste amounted to approximately 485 Kgs per day. Eighty 80% of this waste was collected by waste pickers for sale to local dealers for recycling while the rest (20%) accumulated in the environment.[161]

Statistics show that every year Kenya generates about 13 million litters of used petroleum oil from about Forty (40) million litres of new oil.[162] Most of this oil which is waste is generated from petrol service stations due to the nature of the business that includes maintenance of vehicles, equipment and oil wastes that occur in the course of business through pump nozzles. Waste oil has severe adverse health and environmental impacts and is more toxic than virgin oil due to the presence of degraded additives and other contaminants whose harmful impacts are contamination of soils, DNA changing of organisms and reproductive effects.[163]

Waste oil waste contains Total Petroleum Hydrocarbons (TPH) which is a term used to describe chemical compounds that originally come from crude oil. TPH is comprised of chemicals such as jet petrol, benzene, mineral oil among others.[164]

Due to the presence of the TPH and other pollutants, waste oil from motor vehicle garages may have adverse environmental and human health impacts if not well managed and disposed and accidental or intentional release of fuel oils to soil can affect the soil organisms and if it finds its way to water sources will affect aquatic organisms.

The ERC came up with Pollution Prevention Guidelines in Petroleum Retail Service Stations in the year 2012, which outlined the hazardous substances contained in petroleum products that

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[160] *ibid*
[161] *ibid*
[162] Environment in Kenya, http://csridentity.com/kenya/environment.asp (Accessed 29/06/2015).
[163] UNEP, "Compendium of Recycling and Destruction Technologies for Waste oils," November, 2012.
[164] Agency for Toxic Substances and Disease Registry (ATSDR) (1999), Toxicological Profile for Total Petroleum Hydrocarbons (TPH). Atlanta, Ga: US. Department of Health and Human Services, Public Health Service.

caused health problems through pollution of air, water and soil that are toxic to living organisms and the environment. The guidelines further stated that automobile garages and repair facilities should be designed in a way that minimizes runoff of grease and oils, coolant, gasoline and car battery acid to the storm water system at the retail station.

The guidelines further give specifications of the design for repair and maintenance bay drainage system, the design it should be in a way that all leaks and spills are collected and the drains to be connected to a sump for collection and disposal.

This exposure to a wide range of garage waste chemicals including heavy metals contained in lubricants, brake fluids, greases result in poisoning of the environment. Oil spills are common at garages which are points of waste oil. In Kenya many of the open air garages usually referred to as *'jua kali'* and are owned by individuals generally have poor waste management practices. The other automobile garages that are also motor vehicle sales and service companies and are owned by corporate companies such as DT Dobie, Simba Colt, Toyota, CMV Motors, General Motors just to name a few have managed and better waste management practices and are easier to manage and ensure compliance by the institutions such as NEMA mandated to ensure compliance.

The used oil that is removed from vehicles and machines during servicing and maintenance of the vehicles is referred to as waste crankcase oil. [165] Due to lack of proper treatment and disposal of the oil, the environment is exposed to serious threat.

[165] John.C. Ssempebwa and David O. Carpenter (2008) "The Generation, Use and Disposal of Waste Crankcase Oil in Developing Countries": A case for Kampala District, Uganda.

Most garages in Nairobi are near road reserves, back streets or river banks. Disposal of oil directly into the river and hence the high reports of water pollution are in the region along Nairobi River.

Waste oil is hazardous and should be handled with care to avoid contaminating and causing destruction to the environment.[166] Generators of hazardous wastes have an obligation to secure and clearly label containers or packaging containing hazardous products in English or Kiswahili languages. The contents and type of waste must also be on the labels including the details of the generator of the oil waste as well as a caution or warning statement on the packaging.[167] Persons who generate hazardous or toxic wastes are required to treat or facilitate the treatment of such hazardous wastes using different types of incinerators or any other technology.[168]

Management of the waste oil through disposal should be done in an environmentally friendly and safe manner that does not cause harm to the environmental and human beings but this is seen not to be the case and there is no law for waste oil generators to be held accountable for the waste oil disposal.

3.3. Conclusion

This chapter discussed the operations of petroleum business operators in the retail business. The legal framework with regards to the retail business is well provided for in the Petroleum and Energy Act. We also see the institutional frame work set up to manage the retail operations but implementation mechanisms of the regulations are lacking. The waste oil generated includes leaks from the dispensing equipment, underground tanks, contaminated sand and oil collected from vehicles during servicing. Petroleum business operators generate the waste oil

[166] Waste Management and Coordination (Waste management) Regulations 2006, Regulation 22- Fourth and Fifth Schedules
[167] Waste Management and Coordination (Waste Management) Regulations 2006, section 24 (1)(2)[a-f]
[168] Waste Management and Coordination (Waste Management) Regulations 2006, Section 26 (1)

but accountability of its disposal is missing and thus disposal and environmental protection is not guaranteed. There is a gap on the responsibility of the retail service station owners on disposal of the waste oil. The polluter pays principle is

CHAPTER FOUR

REVIEW OF THE LEGAL AND INSTITUTIONAL FRAMEWORK GOVERNING DISPOSAL OF WASTE OIL BY PETROLEUM BUSINESS OPERATORS

4.0. Introduction

Disposal is a term that defines the process of getting rid of or throwing something away. Usually the substance being thrown away is no longer useful due to the fact that its original form has been changed and does not contain its initial properties and functions. Waste oils are mostly generated from garages, service stations, car dealer showrooms and automotive fleet services among others. These waste oils mainly consist of waste transmission fluids, crankcase, gear lubricants and hydraulic oils, which are very flammable and contain toxic components.[169] Used oil can be used for protecting timber for example fencing posts are soaked in used oil to protect and make them resistant to termite attack. It can also be re-used for purposes of lubrication, in kilns and brick works.[170]

Management of used oil through disposal is very important by the fact that the oil has been contaminated by both physical and chemical impurities that include metal, dirt water among other things and not suitable for use for its original purpose. Safe disposal of used oils from service stations, petroleum tankers, service stations, vehicle/ automobile garages is very important so to minimize contamination of the environment i.e. the soil, water, vegetation as well as avoid causing bodily harm to human beings. Poor handling of waste oil form used oil has contributed immensely towards the degradation of the environment by the handlers or disposers of the used oil.

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[169]Owiti B.O and Ndiritu H. M., *Waste Oil Utilization: Current Trends and Opportunities,* Proceedings of 2013 Mechanical Engineering Conference on Sustainable Research and Innovation, Volume 5, 24th - 26th April 2013

[170]Heino Vest, *'Reuse and Refining of Waste engine Oil'*, 1997 revised in 2000.

The Waste Management Regulations of 2011 provide that the preliminary step is to collect the used oil then the disposal or management of the waste oil should be done in a licensed disposal facility which must be audited annually by experts[171] to ensure that the disposal facility owners comply given the hazardous products they are handling for disposal. However, there is currently no known licensed facility where the collected oil is taken to for disposal.

Waste oils are generated from service stations include that from vehicle maintenance services, tank cleaning and the contaminated sand. All these must be handled with care and proper disposal mechanisms adopted. Petroleum business operators should ensure that the used oils on their sites are properly disposed of. This is a duty of care that they owe and have to the environment and human beings within the area they operate in. The major and continuing source of waste oil is generated from lubricants used in vehicles.[172]

Burning of used oil is prohibited by the National Environmental Standards for Air Quality (NESAQ). If the used oil is to be collected and transported for other used such as electricity, heating, appropriate authorisation and consent must be given and the collector be issued with a licence for the same.[173]

4.1. Disposal of Waste Oil from Ships and Tankers (Ballasting)

When ships carrying petroleum products arrive in the port of Kenya, there are laid out procedures and guidelines on their operations and activities as provided for in the Petroleum Act of 2006 Sec B. There are defined areas at the port for loading and discharging of the

[171]Environmental Management and Coordination (Waste Management) Regulations 2006. Legal Notice no.121
[172]Basel Convention, 'Technical guidelines on Hazardous Waste.' *Waste Oils from Petroleum Origins and Sources.*
[173] Management and Practices of Handling used oil: Code of Practice; HSNOCOP 63, November 2013

products. [174] Prevention of leakage of petroleum form ships and cleaning of the contaminated water bodies in the event of a leakage is also provided in the Act.[175]

The Constitution of Kenya provides for remedies to be addressed by the courts to remedy any actions caused that cause harm to the environment and compensation made to those affected by contamination of the environment.[176] Kenya being a signatory of the Marine Protection Convention (MARPOL) which is an agreement for the protection of the environment, also provides for through its regulations for pollution through oil.[177] The Energy Act No. 12 of 2006 is also clear with regards to reckless collection and disposal of oil sludge and other hazardous pollutants from ships.

In the case of the Republic v Minister for Transport & Communication & 5 others ex parte Waa Ship Garbage Collector & 15 others[178], shows that there are registered companies authorized to clean the oil pollution caused by ships on the Kenyan port, the East African Marine Environmental Management Company and Mats International company. From this it is clear than NEMA has the responsibility of managing, supervising and coordinating all environmental activities undertaken by cleaning and disposal companies and other agencies like KPA as well as work closely with them to ensure the environment is managed with regards to oil pollution by ships.

The case also shows that there have been previous (unreported) incidences of ships discharging oil sludge and other effluents into the environment and no reported or unreported action was taken against the ship owners neither were they held liable for their actions which led to serious damage on the environment.[179]

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[174] Petroleum Act of 2006; Sec B
[175] Petroleum Act of 2006; Sec B, Part 48 (1-5)
[176] Kenya Constitution Section 70 (1-3)
[177] MARPOL 73/78: Annex I
[178] Kenya Law Reports; Misc Civil application 617 of 2003
[179] ibid

The case of ***Republic V Kenya Ports Authority & 2 Others Ex-Parte Kaburu& Sons Ship Contractors & another***[180] demonstrates the weakness in the institutional framework governing waste oil management in Kenya. In this case, Kenya Ports Authority informed Kaburu& Sons Ship Contractors and Mwawako Shipping Agencies of the cancellation of their licenses giving them a right to carry out sludge and waste disposal at the port of Mombasa.

In another case of case of ***Marime Waste Collection Dealers Company and Six Others V National Environmental Management Authority*** (unreported) was also as a result of cancellation of licences of seven firms dealing in oil waste management at the port of Mombasa. The firms involved include Marime Waste Collection Dealers Company, Danka Africa Company, Mawako Shipping Agencies, Kaburu and Sons Company, Coast Waste Oil Transporters Company and Saimbot Ship Contractors Company. Their licenses were cancelled by the Director General of NEMA following an inspection of their waste oil sludge recycling plants based in Mombasa. NEMA found that the facilities were in contravention of license conditions resulting to the cancellation of the licenses. These two cases show that the institutional framework is in place and manages the licensing of waste oil collectors in Kenya.

Pursuant to section 90 of the Act EMCA, the National Environment Management Authority may apply to a competent court for orders compelling any person to immediately stop the generation, handling, transportation, storage or disposal of any wastes where such generation, handling, transportation, storage or disposal presents an imminent and substantial danger to public health, the environment or natural resources.

[180]Republic V Kenya Ports Authority & 2 Others Ex-Parte Kaburu & Sons Ship Contractors & another [2006] EKLR

In the case of Kenya Ports Authority V East African Power & Lighting Co. Ltd1982, KLR pg 410[181]

In this case the respondent had been given a license by the appellant to operate a power station on the appellants' land in the port of Mombasa. There was a leak from the pipes serving the power station, which lead to the waters of the port being contaminated with oil. The appellant sued for damages that were incurred to clean the harbour which as he stated in his plaint were done so as to avoid combustion of the oil.

In this matter the court held that the pollution damaged the port waters and not the property of the appellant. The court further considered the port waters to be *res nullius* meaning they did not belong to anyone and not capable of being owned and therefor the appellant did not have any *locus standi* to sue.

NEMA works with KPA and KMA which are the institutions mandated to ensure that the Kenya marine waters are properly managed and not polluted and if pollution does happen they should work together to ensure that the polluted area is cleaned and the pollutants disposed of in an environmentally sound and approved manner by the licensed disposal agent.

4.2. Disposal of Waste Oil Generated Through Transportation

Pursuant to section 90 of the Act EMCA, the National Environment Management Authority may apply to a competent court for orders compelling any person to immediately stop the generation, handling, transportation, storage or disposal of any wastes where such generation. The right of all Kenyan citizens to a clean and healthy environment is a right provided for in Article 42 of the Kenyan Constitution of 2010. EMCA also provides for access to a clean and

[181] Kenya Ports Authority v East Africa Power & Lighting Co ltd, Civil Appeal No. 41 of 1981. Court of Appeal, Mombasa, 9 March 1982

healthy environment for all citizens. The Basel Convention of Transboundary Movement of Hazardous wastes and their Disposals[182], of which Kenya is a signatory to, affirms that states are responsible for fulfilment of their international obligations concerning the protection and preservation of the environment.[183]

Measures should be taken to ensure management of hazardous wastes including disposal, which are consistent with the protection of the environment and human health whatever the place and method of disposal used is.[184] In light of this responsibility to clean up and restore the environment to its original form ought to rest on those who contaminate it. The case of the River Thange in Kibwezi case, we see KPC embarking on an environmental clean-up of the contaminated area but where they take and dispose the contaminated soil and vegetation is not known or how the same is disposed of is not known.

Disposal Among its mandates includes implementation of Legal Notice no. 121 on Environmental Management and Coordination (Waste Management) Regulations, 2006 which provides for the disposal of Hazardous waste such as used oil.

4.2.1. Waste Oil Collectors

Under the regulation, it is a requirement that waste is transported using a vehicle that has an approved Waste Transportation License issued by NEMA. Wastes generated in Kenya must be disposed of in a licensed disposal facility. Such a facility will require annual environment audit to be undertaken by registered Lead Experts. It is a requirement under the regulation for a proponent to install at their premises antipollution equipment for treatment of various types of wastes. This treatment options shall be approved by NEMA in consultation with the relevant

[182] Basel, 22March 198, 1673 UNTS 126:28 ILM 657(1989); Kenya is a signatory to the Convention
[183] Basel Convention; Preamble
[184] Basel Convention, article 2.8

lead agency. The proponent should liaise with the Department of Public Health and the NEMA officers to ensure that this is adhered to. The regulation contains definitions of hazardous wastes in the Fourth Schedule. The regulation requires that prior to generating any hazardous waste; a proponent shall undertake an EIA study and seek approval from NEMA. Labelling of hazardous wastes is now mandatory under the regulation.[185]

Disposal of waste oil in Kenya is mainly done by private collectors who are required to have two licences to operate as such. NEMA issues the initial licence that allows for waste oil collection generated at the port and the other is issued by the Kenya Ports Authority for collecting waste oil from the inside of the ships.[186] Despite there being licensed waste oil collectors, there are no known licensed places for disposal of the waste oil designated by NEMA or any other regulatory body.

Used oil generators or handlers should ensure they have valid licences, properly identify themselves, have the capacity to carry out their duties, identify where the used oil will be disposed of in an environmental friendly manner. Used oil collectors must be licensed to carry out such business. Used oil may be used by electricity companies, converted to bitumen and used by road construction companies, may be used to make product moulds or re-fined base oil used as lubricant, transformer or and hydraulic oils. Use oil collectors treat and recycle the oil and may also sell it to a specialised used oil recycler.[187]

4.2.2. Disposal of Pipeline Spillage

Oil spills that occur through the pipeline usually lead to the most environmental destruction because they go undetected by the nature of the pipeline being underground and the leaks or

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[185] Waste Management Regulation of 2006; Part 18

[186] Sanga,Benard The East African" KPA, NEMA blamed for poor waste disposal at Mombasa" April 5th 2010 www.the Eastafrican.co.ke/news

[187] Australian Government response to the third independent review of the Product Stewardship (Oil) Act 2000

spills once detected have spread. They are mostly detected either through a fatality or through contamination of water or plants and vegetation.

The Makueni- Kibwezi oil spill cause by an accidental leak in the pipes of KPC resulted into serious environmental contamination due to the oil products seeping into River Thange and other adjacent areas.[188] NEMA served them with restoration orders that required KPC to clean the environment. The obligation for KPC to clean up the environment is also provided for in the Constitution of Kenya which states that every person has the right to a clean and healthy environment which includes the right to have the environment protected for the benefit of the present and future generations.[189] KPC engaged the services of an international company EnviroServ to carry out the clean upon River Thange.

The clean-up process was explained that would include treatment and clean-up of both the contaminated water and soil. This exercise was to be carried out in collaboration with NEMA. Contingency measures were put in place to provide the community with clean water for the period of the clean-up which was expected to take a year. There was contravention of the Waste Management Regulations on the part of EnviroServ, the clean-up contractor who did not have a license to carry out disposal activities and NEMA brought this to the attention of KPC. Other institutions that were involved was the Ministry of Energy & Petroleum (MoE&P), WRMA, this is a clear indication on the mandate of NEMA and goes to show that NEMA and other institutions can be able to manage oil spill environmental issues more than they currently do. What was not clear in this incident however is where the contaminated soil was going to be disposed of and where it was finally disposed of.

[188] Lessons from KPC clean-up of Makueni Oil Spill: Business Daily, Monday February 29,2016; Joe Sang
[189] Constitution of Kenya, Article 42

This incident was not reported to ERC as is required and provided for by the Energy Act.[190] ERC found out about it from other sources. As was verified with the ERC official I interviewed who stated the information came to them through the media and through their investigation verified the incident.

Another incident that occurred in 2016 in Maili-Nne, Eldoret, where water was found contaminated by oil from KPC Eldoret pipeline around 2.5km from the depot along the Eldoret-Kitale highway. In addressing the incident, KPC stated they were working with NEMA and other government institutions and further advised the residents not to use water from the wells in the area.[191] This matter was also not reported to ERC as is the requirement.

In a subsequent incident which occurred along the Nakuru- Kisumu oil pipeline (Line 6) through a leak in Koru, Muhoroni that was caused by an oil marketer who attempted to siphon the fuel by connecting pipes from the KPC oil pipes to his service/ petrol station 100 metres away. It was reported that action would be taken against the rogue oil marketer and the matter had been reported to the police for further action.[192]

In all this incidences responsibility of restoration which involves clean-up of the contaminated soil or environment is seen to be fully taken and borne by the oil marketer in his case KPC but there is no mention on where the contaminated soil is taken to or what is done with it. The obligation of seems to rest after securing the affected areas and investigations of which the findings are not made public even to those affected.

[190] Energy act No.12 of 2006, sec 117
[191] Anonymous report to ERC on 20th February 2016
[192] Business News; by Rogers Tumo, June 21, 2017: KPC commences Clean up following Oil Spill

4.3. Disposal of waste Oil generated at Retail Service Stations

Waste oil is generated from maintenance of automobiles that include vehicles and machines. The process entails cleaning, replacing and removing fluids that include draining and replacing of engine oils... This process takes place at service stations, car garages and manufacturing industries.

The Waste Management Regulations are comprehensive and cover the management of all kinds of waste in Kenya. It provides for hazardous waste which is used oil and sludge generated from Above-Ground Storage Tanks (ASTs) that are found at service stations and the waste is generated periodically.[193] It is a requirement in the regulations that a waste generator is constructed to segregate the hazardous and nonhazardous wastes then disposes the wastes in an environmentally acceptable manner. [194]

Most of the hazardous waste at the service station comes from waste crankcase oil, which is the used oil removed/ drained from motor vehicles during maintenance or service of vehicles.[195] The drained oil is further drained into drums in the service area pits and 'new' oil replaced in the vehicle's engine. The NEMA official I interviewed sated that service station sand garages that offer this services are obliged to keep records that would enable the institution know the volumes of used oil collected at a given period. Unfortunately, this rarely happens especially with service stations which are independently owned and the 'back street' garages set up in areas which are not easily accessible. This in-turn has led to lack of proper disposal of the used oil, the environment is exposed to serious threat.

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[193] Waste Management Regulations of 2006; Part 7-8

[194] *ibid*

[195] John.C. Ssempebwa and David O. Carpenter (2008) "The Generation, Use and Disposal of Waste Crankcase Oil in Developing Countries": A case for Kampala District, Uganda.

In some instances, motorists take away the used oil from their vehicles which makes it hard to manage the disposal of the used oil. A large portion of it is also given away to third parties freely, some sold and the rest poured. Disposal of the used waste oil should be entirely the responsibility of the facility that has generated the used oil to avoid unsafe disposal acts like those discussed above. Unfortunately, this actions will not stop unless enforcement institutions i.e. NEMA and the county officials work and put resources together.

On the other hand, most of the garages in Nairobi are set up near road reserves, back streets or river banks which leads to disposal of oil directly into the river for those near river banks and hence leads to water pollution being high within the areas along Nairobi River and its environs. Used oil on the other hand has various uses ranging from termite control, marking fields in schools, wood preservation among others. Some motorists take away the used oil from their vehicles, a large portion of it is given away to third parties freely, some sold and the rest poured. Disposal of the used waste oil is a challenge to petroleum business operators after collecting it.

Waste management regulations that were enacted under the Environmental Management and Coordination (waste Management) Regulations of 2006 provides for waste generators to collect and dispose waste separately and engage licensed transporters and the waste disposed of in a designated disposal facility.[196] Waste oil is hazardous and should be handled with care to avoid contaminating and causing destruction to the environment.[197] Generators of hazardous wastes have an obligation to secure and clearly label containers or packaging containing hazardous products in English or Kiswahili. The contents and type of waste must also be on the labels including the details of the generator of the oil waste as well as a caution or warning statement on the packaging.[198] Persons who generate hazardous or toxic wastes are required to treat or

[196] Environment and Management Coordination (Waste Management) Regulations 2006, section 2& 3
[197] Waste Management and Coordination (Waste management) Regulations 2006, Regulation 22- Fourth and Fifth Schedules
[198] Waste Management and Coordination (Waste Management) Regulations 2006, section 24 (1)(2)[a-f]

facilitate the treatment of such hazardous wastes using different types of incinerators or any other technology.[199]

Sound management of petroleum related facilities and infrastructure is provided for under the Energy Act.[200] This relates to facilities that handle generation of waste oil so as to avoid pollution of the environment and human health through contact, inhalation or digestion.

Recycled oil can be re-used once contaminants have been cleaned by those licensed to. It can be used for different purposes such as to manufacture bitumen, as an additive in manufacturing products, as refined base oil for use as lubricants, hydraulic or transformer oil.[201]

Unsafe disposal practices of waste oil can result in adverse effects to both the environment and health if not properly managed[202] especially if the used oil is handled by those who do not know or are licensed on its proper disposal.

A report by the Daily Nation on 11 January 2016 revealed that foods sold in Nairobi have levels of toxins in them. [203]A vendor who was interviewed reveled that she bought ten (10) liters of transformer oil for Kshs 7,000/- (Seven thousand Shillings) and used it for three (3) months to make potato chips from a frequent local supplier in Nairobi.[204] The use of transformer oil is rampant as was advised by another resident in a different location in Nairobi.[205] A medical practitioner further stated that consumption of such foods could lead to throat sores, wheezing, coughing and shortness of exposure as well as buildup of fluids in the lungs depending on the amount of exposure.[206]

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[199] *ibid*, Section 26 (1)
[200] Energy Act, 2006
[201] Australian Government response to the third independent review of the Product Stewardship (Oil) Act 2000
[202] Owiti B.O and Ndiritu H. M., *Waste Oil Utilization: Current Trends and Opportunities*, Proceedings of 2013 Mechanical Engineering Conference on Sustainable Research and Innovation, Volume 5, 24th - 26th April 2013
[203] www.nation.co.ke/news/Nairobi-residents-eating-poison-scientists-warn. reported on 11 January 2016
[204] *ibid*
[205] *ibid*
[206] *ibid*

Part II, section 10 -12 of the EMCA Waste Management Regulations provides for any person licensed to operate a waste disposal plant or site shall dispose of waste in an environmentally friendly manner. The Petroleum business operators have the responsibility to ensure safe disposal of waste and this responsibility should be extended to third parties e.g. those who purchase products from the petroleum operators such as oils and lubricants. Responsibility of ensuring the safe disposal of the contaminated lubricants and oils in their possession from their vehicles should lie with them.

The Authority (NEMA) is mandated to administer of Environmental Impact Assessments (EIA) to petroleum business operators who have facilities that deal in petroleum business such as service stations, businesses that recycle used waste oil[207]. Failure to undertake the assessment may lead to action being taken against the facility owners.[208]Handling, transportation, storage or disposal presents an imminent and substantial danger to public health, the environment or natural resources.

4.4. Collectors of Waste Oil

Disposal of waste oil in Kenya is mainly done by private collectors who are required to have a licence to operate from NEMA.[209]

The National Environmental Management Authority was established as the principle instrument of government charged with the implementation of policies related to the environment. Management of waste oil is within its scope as well as disposal of used oil.[210]

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[207] Legal Notice 101, environmental (Impact Assessment Audit) Regulations 2003
[208] Government of Kenya, (1999), Environmental Management and Coordination Act.
[209] Sanga,Benard The East African" KPA, NEMA blamed for poor waste disposal at Mombasa" April 5th 2010 www.the Eastafrican.co.ke/news
[210]The Environmental Management and Co-Ordination Act, 1999

Environmental Management and Coordination (Waste Management) Regulations 2006 Regulation 22, the fourth and the fifth schedule of the waste management regulations categorize used oil as hazardous waste and give specifications for handling hazardous waste.

The stakeholders in disposal of waste oil are the collectors, transporters, transfer stations and recycling factories all these stakeholders require licences in order to transact with each other in waste oil. In addition to that they must have in place an Emergency Response Plan (spill contingency plan, spill control equipment, a fire control plan, an evacuation plan) in case of incidents, spillages, fires, explosions etc.[211]

The East African Marine and Environmental Factory in Likoni was established for the sole purpose of recycling of sludge and oil waste products, however this factory has seized to be operational since 2005.[212] There are many factories that deal in recycling of sludge; however, there is no proper regulation by NEMA with regards to ensuring these factories do not affect the environment and people living in it. Those intending to establish a recycling facility ought to obtain an Environmental Impact Assessment (EIA) license before commencement. The recyclers only receive used oil from licensed transporters. [213]

Marine Environmentalist have expressed concern as to the pollution of living organisms including plants in the environment resulting from poor waste management disposal that includes poor monitoring of sludge recycling factories.

In the case of ***Environmental & Combustion Consultants Ltd v Kenya Pipeline Company Limited & 2 Others (2016) Eklr,*** the applicant wanted the award granted to the 2nd Respondent

[211] NEMA: Draft Technical Guideline on Management of Used Oil, February 2014.
[212] National Energy and Petroleum Policy; January 2015
[213] ibid

quashed and it be prohibited from conducting the clean-up of an oil spillage claiming it was awarded unfairly. OdungaJ, denied the order and held that "the principal of proportionality which require that public interest to be taken into account and the need to secure the environment for the wider benefit and interest of Makueni County; and the fact that NEMA is under an obligation to continuously monitor the progress of oil spillages and take appropriate steps.

Employees employed in collection, transportation and disposal of harmful waste substances and are directly exposed to the harmful wastes should be provided with suitable personal protective equipment while at work. They must also be trained and adequately informed on handling chemicals and hazardous products while at work. This includes procedures to be followed in the event of spills or leaks that could accidentally occur.[214]

4.5. Disposal by Recycling

Recycling involves the process of converting waste products into new materials and objects. Recycling leads to reduction of environmental pollution.[215] Recycling also means reclaiming, reprocessing and regeneration of used oils by the use of an appropriate selection of chemicals and physical treatment methods.[216]

Oil waste recycling involves recycling used oils and creating new products from the recycled oils.[217]

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[214] Occupational Safety and Health Act No. 15 of 2007(revised edition 2010); Hazardous Substances Rules, 2007 No. 60

[215] J. Lienig, H. Bruemmer (2017). "Recycling Requirements and Design for Environmental Compliance". *Fundamentals of Electronic Systems Design*. Springer. pp. 193–218.

[216] Government of Kenya, (2006), Environmental Management and Coordination Act (Waste Management) Regulations 2006. Government Press.

[217] *"Managing Used Oil: Advice for Small Businesses | Common Wastes & Materials | US EPA". epa.gov. 2012. Retrieved July 2, 2012. waste*

The recycling and reusing used motor oil is the preferred method to disposal and can provide environmental benefits. The recycled motor oil can be re-fined into new oil then processed into fuel oils and used as raw materials for different industries.[218]

Used oils that include engine-lubricating oils, gear oils, hydraulic fluids can pollute the environment if they are not recycled or disposed properly. Used oil should be managed properly by local waste management authorities to prevent contamination of the environment. [219]

Used oil can be recycled and used in steel processing plants, for fuel for industrial boilers, manufacturing new lubricants, wood preservation, termite control, marking fields in schools in stone quarries, for making roads, pesticides just to name a few.

Part of the arguments presented in the case of ***the Republic v Minister for Transport & Communication & 5 others ex parte Waa Ship Garbage Collector & 15 others***[220] were with regards to cleaning and treating of the sludge which is composed of water, soil, plants and the oil. The treatment of the sludge which includes sorting, screening and decanting would result to traces of oil, water and solid waste which can all be used for different purposes such as the furnace oil and engine lubricants, the water can be used for irrigation and the solid waste can be used as fertilizer. This case shows that there are guidelines on recycling of waste oil that are followed by licensed collectors.

The Energy Act, 2006 allows the Cabinet Secretary responsible for Energy to provide regulations for environmentally sound management of petroleum related facilities and infrastructure.[221] This would involve waste-oil recycling plants by virtue that they handle petroleum products.

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[218] Ibid
[219] Ibid
[220] No. 617 of 2003
[221] Energy Act, 2006 Sec 102

The Environmental Impact Assessment and audit Regulations of 2003 provide that owners of waste-oil recycling facilities must be audited due to the fact that their operations are likely to have a serious impact on the environment if not properly managed.[222]

Under section 93 of the Environmental management and co-ordination Act, 1999 waste oil operators/ recyclers are required to undertake impact assessments on their facilities before undertaking any such projects[223] and have periodic assessments. There is no way of ensuring this is complied with and if so the levels of compliance. This is according to the Chairman of the Petroleum Institute of East Africa (PIEA) because as far as he remembers, there has not been a report given to the institute with regards to compliance assessments and verifications carried out on any of the licensed facilities since his tenure and as a member of the institute for now 4-5 years this was confirmed by the first respondent.

The Waste Management Regulations of 2006 provide for how the waste generated form the recycling of waste oil should be disposed of and maintain tracking documents/ records for the collected and disposed waste in the facility.

Petroleum Business Operators should propose the setting up of a recycling system where the waste oil is collected and taken to a central place where it is recycled and managed. The Petroleum Business Operators would them register and use these services.

4.6 Disposal through Landfills

The Environmental Management and Coordination Act of 1999 provides for those who own and operate waste disposal plants or sites must obtain a license from NEMA to operate such a facility.[224]

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[222] Environmental (Impact Assessment and audit Regulations), 2003, Regulations 4 and 31
[223] EMCA 1999, section 93
[224] EMCA Part VIII part 9

A person who is issued with the license, must comply with all conditions as stipulated by NEMA to ensure the site conducts its business in an environmentally sound manner[225] in partnership with the local authorities and departments such as Department of Public Health to ensure adherence.

This option of burying the waste oil is a method of disposal but has a risk of further contaminating the environment. There is no law on management of landfills in Kenya which would lead to further negative impacts and re-contamination of the environment.

The Waste Management Regulation provides for other options of hazardous waste disposal to include incineration and any other options provides by the authority – NEMA.[226]

4.7 Disposal through Incineration

The Waste Management Regulation provides for other options of hazardous waste disposal to include incineration and any other options provides by the authority – NEMA.[227]

The waste oil can also be disposed of through the process of incineration.

Incineration is waste destruction in a furnace by controlled burning at high temperatures. The act of incineration removes water from hazardous wastes, reduces its volume, and converts it to a non-burnable ash that can be safely disposed of on land, in some waters, or in underground pits.[228]

According to MARPOL 1973/8 Convention of IMO Annex VI for prevention of air pollution from ships, the guidelines regarding the waste material storage and disposal of waste at sea need to be strictly followed. Incineration of various materials such as oil sludge from lubricating oil, fuel oil and purifier is one of the most effective ways of disposal and saving

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[225] Waste Management Regulations, Part II Sect 10 (1-5), 11 & 12
[226] Waste Management Regulations, Sect 19
[227] Waste Management Regulations, Sect 19
[228] Knox, Andrew (February 2005). "An Overview of Incineration and EFW Technology as Applied to the Management of Municipal Solid Waste (MSW)" (PDF). University of Western Ontario. Archived from the original (PDF) on 5 December 2008.

storage capacity of the tanks and waste storage containments on ships. The residue left from the incineration can be easily disposed of off as it burns of and mainly consists of ash.

4.6. Conclusion

In this chapter we have seen that EMCA provides for different disposal methods of waste oil and NEMA is fully mandated to manage this as well as license business owners who handle waste oil. handlers for the products and how they should behave to minimize both environmental and health pollution that would be caused from miss- management/ handling of the used oil. The gap here is on the involvement of the petroleum business operators in any the disposal methods.

We have also seen that the waste collectors do not involve the petroleum business operators are not involved in the disposal process at any point and degradation from the recycled products. Implementation of the laid down regulations with regards to this by the institutions is not seen to ensure there is no further contamination.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0. Summary of Findings

The general objective of this study was to assess and analyse how effective the legal and institutional framework is in handling waste oil management in Kenya. The objectives of the study were to analyse how effective the available laws and regulations are in relation to accidental and intentional spills, to analyse the performance of the institutional frameworks regulating the management of the spills; to determine the accountability of petroleum business operators with regards to waste oil management occurring through their operations. Then finally recommend and propose reforms and measures to be taken by the legal and institutional frameworks for management of oil spills.

This study addressed the hazardous components contained in waste oil as well as the serious effects the waste oil can and has had to the environment that includes human beings, plants, animals & other living organisms, water bodies and the environment at large due to its mismanagement.

This study has found that handlers of petroleum products who are the petroleum business operators generate waste oil through accidental spills such as leaks and intentional or negligent activities. The study has further shown that the spills occur as a result of activities that start from supply of the products during importation; leaks at the refinery; through transportation both using the pipeline and road tankers; through fuel dispensing pumps and underground tanks stored at retail filling stations. As well as through activities at automobile garages and workshops; industrial activities and from cleaning of oil tankers and storage tanks.

The study found that there are laws and regulations in place with regards to management of petroleum products in particular oil and waste oil but the laws need to be reinforced through implementation which is seen to be missing. The study also shows that the institutional frameworks are not fully utilizing and enforcing the authority they have and this has led to undesirable business practices that are out of the laid down standards and guidelines and this is as a result of the minimal care and disregard and ownership of their actions.

From the study, it is also clear that Petroleum Business Operators on the other hand have the mandate to ensure that their activities whether importation, storage, selling and transportation of petroleum products as well as management of waste oil generated from their operations does not cause harm to the environment. If their operations cause harm, the duty to clean and restore the environment to its original state lies with them in collaboration with the institutions that manage and govern environmental matters. Hence, the role of petroleum business operators is very crucial in waste oil management.

The study further found that petroleum business operators and industries that handle petroleum products have a Health, safety and Environment department that handles any environmental related issues that include leaks and spills. This is also a standard and laid down regulatory framework of ISO 14000, Environmental Management System (EMS) but it is not effective in enforcing its authority on the petroleum business owners.

5.1. Conclusions

The study shows that there is legislation with regards to waste oil and its management with regards to the petroleum business. However, the laws are not sufficient with regards to ensuring that those who generate the oil are held liable for their actions in all the stages of their business operations. The law should be amended to incorporate all the principles of Environmental Law

ie the polluter pays principle, precautionary principle, preventive principle, principle of sustainable development, the integration policy and the principle of public participation.

This study has also shown that there is are institutional frame works that exist and have authority and the mandate to handle issues of waste oil management. This includes management of waste oil generated at different stages of the petroleum business ie during transportation, storage of the products, handling and dispensing and finally the disposal stage. Enforcing the laid down legislation and requirements on the petroleum business operators is what is lacking on the part of the institutions.

5.2. Recommendations

With regards to generation of waste oil, the Constitution of Kenya with regards to environmental matters and sustainability of the environment should be fully enforced. Systems that can be tracked and monitored should be put in place for period environmental audits, impact assessments to eliminate processes and actions that are likely to endanger the environment. Through the assessments, Environmental Management Plans can be developed.

Ships that come into the Kenya ports should strictly comply with guidelines and standards of the Kenya Maritime Act and International Ship Standard Safety which is contained in the International Convention for the Safety of Life at Sea (SOLAS) 1974. The institution should enforce these standards contained in the Act and Convention and apply sanctions as provided, for violation leading to marine pollution through oil spills or leaks.

5.2. General Recommendations

5.2.1. Introducing of Standard Guidelines for Garage/ Automobile workshops

Management of the informal garages and automobile workshops especially those that are constructed in any part or corner of the countries should be subjected to the same regulations,

standards and compliance standards as those formally constructed by registered business operators. These businesses should comply with a license to handle and generate hazardous petroleum products especially those garages who are near rivers and other water bodies, compliance with the Environmental Management and Coordination (Water Quality) regulations of 2006. The license would be obtained and issued by NEMA. Compliance with the Waste Management Regulations of 2006 should not be an option but an obligation. They should work with licensed oil waste collectors to dispose of the waste oil generated form their activities.

5.2.2. Audits Carried out at The Retail Service Stations

Annual audits which are currently not done at retail service stations, should be done by both NEMA and ERC officials in collaboration with the petroleum business operators. This is to ensure that the facility and equipment available for fuel storage and dispensing are in compliant with standards set out in the Petroleum Act of 2006 as well as the Energy Act No.12 of 2006 condition that would with regards to specifications of the equipment's.

Most of the retail service stations especially the older ones were constructed many years ago and auditing them would be beneficial and would ensure that the facilities are compliant and any anomalies including leaks would be detected and the structures upgraded and improved to comply and be made with environmentally friendly material, infrastructure and design.

An amendment in the Energy Act should be made to compel all petroleum business operators with retail service stations or any facility that stores underground fuel tanks to have oil leak detectors fitted.

5.2.3. Formation of a Mutual Aid Group by Petroleum Business Operators

The Petroleum Business Operators should come together and form a mutual aid group similar to the Oil Spill Mutual Aid Group (OSMAG) with which they would speak one voice and together to address the issues with regards to the safe disposal of the waste oil they generate through their operations. Membership of the mutual aid group would be comprised of the petroleum business operators whose common goal would be to ensure that the waste oil is collected from their facilities by designated licensed waste oil collectors.

The mutual aid group would then be able to hold the waste oil collector/s liable for safe disposal by cleaning and recycling of the waste oil and there after managing its distribution. Proper records would be kept and supervision. The waste oil collectors would also be part of the mutual aid group.

Membership of this group would be mandatory and an annual fee paid towards it and an annual license issued. This license would form part of the requirements and conditions for renewal of the ERC trading license similarly like it is a requirement to be a member of OSMAG and have a valid license for renewal of the ERC trading license.

5.2.4. Continuous Training of Employees of Petroleum Business Operators

Service station employees should be trained on safe and proper handling of petroleum products especially those that are because of a spillages and or crankcase oil generated from maintenance of vehicles, as well as training on waste oil spills management. Records of these trainings should be available. The employees should be provided with personal protective clothing and equipment as is provided in the Occupation Safety and Health Act of 2007. A spill management and containment plan should be introduced and known by all staff in such facilities.

Training of drivers of oil tankers must be implemented and enforced by the institutions. ERC should be very stringent while issuing petroleum tanker owners with a license to transport petroleum products. The driver's licenses should be renewed annually.

With regards to waste oil transportation, through transportation of hazardous products such as petroleum products. The citizens have a duty to cooperate with state organs and others to protect and conserve the environment as well as ensure sustainable development.

5.3. Legal Reforms

5.3.1. Short Term Reforms

5.3.1.1. Environmental Management and Coordination Act (EMCA)

The study has established that in the short term, there is need to amend EMCA to give more powers to NEMA, with regards to management of waste oils. The amendment to the Act would reform the institutional framework of NEMA to include the creation of a waste oil management department and team charged with the responsibility to deal with petroleum business operators and specifically waste oil management. Adequate resources and support would be allocated to NEMA to support this. Some of the powers would include introduction of stringent requirements to waste oil collectors while renewing their annual licenses. Petroleum business operators would also need to get waste oil management certificates that would be one of the requirements for annual renewal of their trading licences.

5.3.1.2. National Environmental Tribunal

The study also recommends that reforms should be undertaken with regard to the National Environmental Tribunal which is formed under EMCA to hear disputes arising from decisions made by NEMA on licenses and give direction regarding other environmental issues. The tribunal should also be allowed to hear disputes with regards to hazardous substances that affect

the environment specific to petroleum products and generation of waste oil as well as management of the waste oil management. This will enable oil spill cases to be dealt with by the Tribunal who will ensure clean up and restoration activities are fully complied with.

5.4. Long Term Reform

5.4.1. The Constitution of Kenya 2010

The study recommends in the long term, Chapter 5, Article 67 of the Constitution which creates the National Land Commission should be amended so that it creates a new commission to handle land as well as environmental issues. The proposed commission would be named National Land and Environment (NLEC). The commission would have two directorates headed by Director Generals dealing with land and the others dealing with environment. This would mean the scope of the commission is enlarged to incorporate environmental matters. The commission would take over the functions of NEMA but with an expanded mandate. By elevating it to a constitutional commission, the NLEC would be insulated from political interference by the line ministry and would be allocated resources directly from the exchequer therefore maintaining financial autonomy.

5.5. Institutional Reforms

5.5.1. National Environment Management Authority

The study recommends that a department that handles waste oils be created within NEMA structure which does not exist currently. This department would be headed by a director and would handle matters related to waste oil that include businesses and industries that engage in activities that lead to generation of waste oil, petroleum business operators being one of them. Oil waste collectors would be better regulated and their activities monitored by the department. This would include but not limited to introducing and enforcing stringent requirements with

regards to renewal of their annual licences. The national government would have to allocate more resources to NEMA to enable it to undertake this expanded mandate.

5.5.2. Energy Regulatory Commission (ERC)

The study recommends that ERC revise the requirements for petroleum business operators to obtain their annual trading license to include a clearance license from NEMA on waste oil management and disposal for the preceding twelve months as well as a valid agreement with an approved waste oil collector. The documents provided would also include information for the preceding year of operation on the amount of waste oil generated and collected at the sites, the waste oil collector who was engaged and a report issued by the waste oil collector, stating the method that was used to dispose the waste oil. Business operators who would not provide this information would then not be issued with a trading license.

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