



**AN ANALYSIS OF ENVIRONMENTAL OBLIGATIONS AND LIABILITIES OF A DISTRIBUTION  
DIVISION TO IMPROVE ECOLOGICALLY SUSTAINABLE DEVELOPMENT**

**BY**

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**Dissertation submitted in partial fulfilment of the requirements for the degree in**

**Master of Environmental Management.**

**in the**

**FACULTY OF APPLIED SCIENCES**

**Department of Environmental and Occupational Studies**

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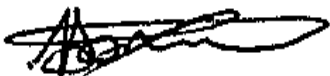
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**November 2018**

## **Declaration**

I, Aphelele Tomsana, declare that the content of the work contained in this dissertation represents my own unaided work, and that the dissertation has not previously been submitted for academic examination towards any degree at any university or undertaken by any other institution before. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology. The sources that I have used or quoted have been indicated and acknowledged by means of a complete reference.



**Signed**

26/11/2018

**Date**

## **Abstract**

Worldwide, there is a growing about the protection of the environment while ensuring social and economic development for the benefit of the existing and forthcoming generation which pressures every person to take reasonable measures when conducting his/her business. Amongst the reasonable measures, there are environmental legislative provisions enacted by the international community, as well as locally, to regulate required actions for the protection of the environment.

South Africa's environmental legislation outlines ecologically sustainable development by making provisions in the Bill of Rights in the Constitution for everyone to take reasonable legislative measures to alleviate damaging impacts on the environment. International conventions have assisted South Africa and other countries worldwide in environmental protection, thus improving ecologically sustainable development.

Eskom's (the South African power utility) distribution department, referred to as the Company from here onwards, has established environmental objectives and commitments to prevent pollution, promote environmental reporting, comply with all the applicable environmental legislations and other relevant requirements to ensure performance is measured and continual improvement is achieved.

The research used both quantitative and qualitative research methods to analyse environmental obligations and associated environmental liabilities of the Company to improve ecologically sustainable development. In order to answer the research questions and achieve the objectives, a set of questionnaires was distributed to sampled respondents; data were retrieved using SAP EH&S Incident Management software while independent variable (environmental obligation) and dependent variables (environmental liability and ecologically sustainable development) were identified. Site visits were also conducted. Furthermore, a correlation coefficient analysis test was calculated using Microsoft excel and a graph was used to illustrate the R-Square value. Positive (+1) relationship between variables was observed which indicates dependability of dependent variable to the independent variable.

The research findings indicate that the environment can be safeguarded through understanding and implementing environmental obligations and environmental liabilities to protect the environment for the benefit of the current and future generations by improving ecologically sustainable development. South Africa (1998a) explained that the environment is held in public trust for the people, thus the beneficial use of environmental resources serves the public interest and the environment must be safeguarded as a common heritage. Therefore, anyone found to have contravened legislation will be held liable in the form of sanctions as stated in South Africa, (1998c).

An environmental obligation is a duty of care imposed on the user, landowner or a person in control of the protection of the environment and, where protection is impossible, to remediate the

impact for the benefit of contemporary and upcoming generations. This is reasonably in line with the principles of sustainable development and a continual improvement of environmental quality and services.

There have been dependent variables in the research where both environmental liability and ecologically sustainable development are dependent on environmental obligations (an independent variable) being realised. For this reason, every person or institution should ensure that environmental obligations are understood, adhered to and ensure that ecologically sustainable development is achieved.

The Company has undertaken business activities to ensure that electricity is distributed to a wider population, bearing in mind that the interaction may have negative impact on the environment. When any incident that degrades the environment occurs, the incident is reported and managed throughout its life-cycle. There are, however, cases where environmental obligations are not understood or implemented.

There is a need to ensure that all people that undertake activities that have a negative impact on the environment, such as pollution of the environment, are properly trained to be able to identify such activities, set environmental objectives and management programmes. Additionally, monitor the implementation of those programmes to ensure that these objectives are met and to achieve ecologically sustainable development. Ecologically sustainable development is achieved when environmental obligations are adhered to and required environmental liabilities are implemented and monitored.

SANS ISO 14001: 2015 is an Environmental Management System which can be implemented to help any company understand its business operations, identify environmental issues, find solutions and ensure that all environmental issues are addressed, and good environmental performance is realized.

**Key Words:** Environmental Obligations, Environmental Liability, Ecologically Sustainable Development, Environmental legislation, Environmental Management Systems.

## **Acknowledgments**

I, Aphelele Tomsana, would like to acknowledge and offer sincere gratitude to the institutions which contributed by means of financial support and to the following for their valuable contribution and help during the study period. I am grateful to Eskom distribution division in the Free State Operating Unit which afforded me an incredible opportunity to conduct my research and provided access to environmental data and participation in the research.

Lastly, I would like to thank the following people who supported and guided me throughout my research project:

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## **Dedication**

I would like to dedicate this work to my late brother, Alert Avela Tuba, who supported me and took on a fatherly role from my first day at the university, but God decided to take him away in 2008. To my mother, Florence Nongamcingi Tomsana, who acted as both a mother and a father figure up to now. To both my late grandfather, Santshuntshu Jack Tomsana, and late grandmother, Nonambala Patase Tomsana, for looking after me since the day I was born on Christmas day.

I also dedicate this work to my daughter, Thumtha Gxotiswa, who happened to be born on my first year of studying Master of Environmental Management and to everyone out there who still believes in the power of hard work and perseverance to help them reach their goals in life through the power of almighty God and our forefathers; also, to everyone who supports development but still bears in mind the importance of protecting the environment while promoting social and economic development, thus securing ecologically sustainable development and the improvement of the quality of life.

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## Clarification of Basic Terms and Concepts

<b>Acronyms/ Abbreviations</b>	<b>Definition</b>
CPA	Criminal Procedure Act, 1977 (Act 55 of 1977).
Dx	Distribution Division.
ECA	Environmental Conservation Act, 1989 (Act 73 of 1989)
EIA	Environmental Impact Assessment.
EMS	Environmental Management Systems.
Eskom	State Owned Power Utility.
FS OU	Free State Operating Unit.
Gx	Generation Division.
HAS	Hazardous Substances Act, 1973 (Act 15 of 1973)
ISO	International Organisation Standardisation.
NEM: AQA	National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)
NEM: BA	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)
NEM: ICMA	National Environmental Management: Integrated Coastal Management Act, 2008 (Act 24 of 2008)
NEM: PAA	National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003)
NEM: WA	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NVFFA	National Veld Fire and Forest Act, 1998 (Act 101 of 1998)
NWA	National Water Act, 1998 (Act 36 of 1998)
PCBs	Polychlorinated Biphenyls.
PPP	Polluter Pays Principle.
Tx	Transmission Division.

**Acronyms/ Abbreviations****Definition**

UNCED	United Nations Conference on Environment and Development.
UNSD	United Nations Division for Sustainable Development.
UNEP	United Nations Environmental Programmes.
UNESCO	United Nations Educational Scientific and Cultural Organisation.
UNMDGs	United Nations Millennium Development Goals.

## Terms/ Concepts and Description

<b>Terms/ Concepts</b>	<b>Definition/ Explanation</b>
Compliance obligations	Legal requirements that an organisation has to comply with and other requirements that an organisation has to or chooses to comply with (South African National Standards [SANS], 2015).
Continual improvement	Recurring activity to enhance performance (SANS, 2015).
Ecosystem	A dynamic complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit (South Africa, 2003).
Environment	Surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation (South Africa, 1998a & SANS, 2015).
Environmental aspects	Elements of an organisation's activities, products or services that can interact with the environment (SANS, 2015).
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially, resulting from an organisation's activities, products or services (SANS, 2015).
Environmental Management	The controlling of the organisation's activities, products and services that have or could have a detrimental impact on the environment (Fuggie & Rabie, 2009).
Extended Producer Responsibility Measure	Measures that extend a person's financial or physical responsibility for a product up to the post-consumer stage of the product (South Africa, 2008).
Fire Danger	A chance of a veld fire occurring or an existing veld fire getting out of control and the anticipated rate or intensity with which it will burn (South Africa, 1998b).
Pollution	Any change in the environment caused by; substances; radioactive or other waves; or noise, odours, dust or heat, emitted from any activity whether engaged in by any person or an organ of state South Africa, 1998a).
Protection	Maintenance of the quality of water resource to the extent at which the water resource may be used in an ecologically sustainable way (South Africa 1998c).

**Terms/ Concepts****Definition/ Explanation**

The Company

Eskom Distribution Division.

The Constitution

The Constitution of the Republic of South Africa [South Africa], 1996.

## Dissertation Preface

The research work presented in this dissertation was conducted at the Company's distribution division in the Free State Operating Unit in South Africa. The focus of the research was on the analysis of environmental or environmental obligations and associated liabilities to improve ecologically sustainable development.

This dissertation has Seven (7) chapters, which are set out as follows;

**Chapter 1 – Introduction:** The chapter gives details of the background of the research, the research objectives, significance of the research and research limitations. The chapter provides a brief description of the key areas that are required in order to ensure and improve ecologically sustainable development in the Company's distribution division in the Free State Operating Unit.

**Chapter 2 - Literature Review:** This chapter undertakes a literature review based on the analysis of three concepts: environmental obligations, environmental liability and liabilities, and ecologically sustainable development. This will emphasise the Company's environmental obligations and liabilities in order to improve ecologically sustainable development.

**Chapter 3 - Research Design and Methodology:** The chapter provides details of the research design and methodology of the research, data collection, data analysis and presentation used during the study.

**Chapter 4 – Results, Analysis and Interpretation:** This chapter provides results, analysis and interpretation of data used in this research study.

**Chapter 5 - Conclusion and Recommendations:** This chapter summarises and concludes the findings based on the research questions and hypothesis as well as providing recommendations to mitigating the identified problem(s).

**Chapter 6 – References:** This chapter provides a list of research material consulted to make this research possible.

**Chapter 7 – List of Addenda:** This chapter provides supporting documents and templates which assisted with the carrying out of this research.



**CHAPTER ONE (1):**  
**Introduction**

## **CHAPTER ONE (1): Introduction**

### **1.1. Background of the Research**

Governments are generally aware of environmental issues worldwide and in South Africa in particular. The environmental issues arise out of the organization activities, products or services which are among other things; oil spillage incidents from faulty oil containing equipment's, bird mortality from bird or animal electrocution and collision incidents and veld fire incidents to mention a few.

Governments therefore develop legal environmental provisions, as specified in section 24(b) (iii) of the Constitution of the Republic of South Africa, 1996 which states that 'everyone has the right to an environment which is protected for the benefit of the present and future generations. This is achievable through reasonable legislative and other measures that secure ecologically sustainable development and use of natural resources while promoting economic and social development (Constitution of the Republic of South Africa [South Africa], 1996). Accordingly, everyone has to understand personal environmental obligations in order to achieve ecologically sustainable development (South Africa, 1996).

The international community has, within its powers and understanding of environmental obligations, made use of an international environmental law which outlines a duty of care for environmental degradation (South Africa, 1996; Paschke & Glazewski, 2006).

Environmental obligations comprise several environmental degradations over a period of time, which are premeditated to remediate past infringements that impact on the environment negatively. The underlying cause of an environmental liability, as described by the environmental legislative framework, is the contemporary and forthcoming environmental deterioration resulting from the business operations at which remedial actions are required to bring the environment to its natural state (South Africa, 1998a; Mason, 2003).

Newbery and Eberhard (2008) argue that as much as South Africa is a signatory to international treaty such as the Kyoto Protocol of 2002, it is a developing country and therefore has no commitment to reduce greenhouse gas emissions. This contradicts national environmental protection acts specified in South Africa (1998c) and (South Africa, 1998a) which require any person to take reasonable measures to prevent environmental degradation, hence improving ecologically sustainable development (South Africa, 1998a; South Africa, 1998c). Therefore, a developing country is not exempted from preventing ecological degradation.

Often, the challenges related to environmental obligations and liabilities occur when environmental planning, threshold (limitations) and financial constraints of a proposed project require building, maintenance and refurbishments or re-routing (Halbert & Erbguth, 1999). South Africa amends its environmental legislation when the need arises, for the country to safeguard historical, existing and

forthcoming environmental impacts that have resulted or may result in environmental degradation. This is done to improve ecologically sustainable development (Glazewski & Witbooi, 2002; Van der Linde, 2006).

The South African Constitution describes the Republic of South Africa as one, sovereign, democratic state, founded on various values and the rule of law to ensure accountability, responsiveness and openness. Environmental rights assign environmental obligations to everyone in South Africa. Thus, the Constitution of the Republic of South Africa is based on fairness, where everyone is expected to respect, promote, protect and fulfil environmental rights (South Africa, 1996).

Every person has the right to a safe environment. A safe environment is of importance to current and upcoming generations and will secure and improve ecologically sustainable development. It is for this reason that, in addition to employer liability, any person who is responsible for causing the degradation of the environment while performing functions in line with his or her business or employment on behalf of the employer, may be held liable in a personal capacity (South Africa, 1977; South Africa, 1998b; Bareki, 2006).

The business operations that safeguard the environment and promote social and economic development would enable the organisation to develop significantly in a sustainable manner, and thus improve ecologically sustainable development. Sustainable development is an integration of social, economic and environmental aspects into the preparation, operation and management of the Company's activities to ensure that development serves the interests and benefits of current and upcoming generations (Lawrence, 1997; Harris, 2003; Holden & Linnerud, 2007; Holden, Linnerud & Banister, 2014 & 2017).

Sustainable development aims at environmental management and the wise use of natural resources. This entails enjoying the benefits of the present-day environment and preserving the same benefits for future generations. By taking informed scientific decisions as the best practicable environmental option, the environment will be favourable for the wellbeing of the present and future generations and therefore improve ecologically sustainable development.

Ecologically sustainable development refers to a progression of attractive targets which consider and protect the ecological factors while promoting social and economic growth (Lawrence, 1997; Van der Linde, 2006; Oyedepo, 2012). Thus, from the planning, operation and evaluation stages, the developer often decides to develop without the liability of forthcoming groups to meet their own necessities (Emmery, 1993; Harris, 2003; Preston, 2006).

To resolve the foreseeable encounters between economic and environmental obligations, Australia has established an ecologically sustainable development method to structure a policy framework for the use of natural resources without manipulation (Emmery, 1993).

Goosen (2012), Holden, Linnerud and Banister (2014; 2017) explain that worldwide, institutions integrate ecological activities and performance with their financial statements and reports. This is done to engage stakeholders and make them aware of environmental issues which must be addressed by organisations. This addresses the sustainable development pivotal aspect agreed on in the international environmental law of the Millennium Development Goals (Kates, Parris & Leiserowitz, 2005; Olawuyi, 2012).

South Africa is a signatory to international agreements to safeguard the environment and improve ecologically sustainable development which results in the amendments of the country's legislation from time to time. This initiative has been a result of business contributions to environmental degradation. In the electrical infrastructure sector, previous studies have revealed that oil spillage has caused environmental pollution in several resource-based places and countries such as the United States of America (USA), Niger Delta (Nigeria), Loango (Congo-Brazzaville) and Cabinda (Angola) (Meinschein, 1961; Keith & Telliard, 1979; Olawuyi, 2012).

The oil spillage incidents in the electricity sector (of oil containing PCBs) contaminate many bodies of water. These incidents are sometimes caused by electrical faults and vandalism of transformers which result in oil spillage and severe degradation of the wetland ecology, wildlife and biodiversity, thus denying ecologically sustainable development. Wetlands offer a variety of amenities and purposes and are a habitat to various species.

Negative impacts to such bodies of water result in the deterioration of the ecological environment (Ramsar Convention, 1975; Bouwman, 2002 Garner & Davidson, 2011). A direct social, economic and cultural value is fundamental to the existence and comfort of almost all South African communities, as it provides indispensable life support to several plant and animal species.

The electricity sector uses hazardous substances such as polychlorinated biphenyl (PCBs) containing a substance which assists as a cooling agent. PCBs are very stable mixtures that are resistant to extreme temperatures and pressure (Ballschmitter & Zell, 1980). According to Ross (2004) Polychlorinated Biphenyls (PCBs) were generally used in several electrical applications more than 25 years ago due to their insulating and fire-retardant properties. For example, PCBs were used in capacitors and transformers (Ballschmitter & Zell, 1980).

The international community has conducted studies to identify and minimise environmental effects associated with persistent organic chemical pollutants such as asbestos and PCB, which pose a threat to the environment and human health (Stockholm Convention, 2002; Bouwman, 2004; Eskom, 2015). South Africa has signed an international agreement to avoid, reduce and eliminate such pollutants through phase-out plans. Therefore, any company which still uses substances that are damaging to the environment must phase them out or be prohibited from producing such pollutants.

In this Chapter, the researcher will be using Eskom distribution division in Free State Province as a case study to achieve the objectives of the research as stated in Page 7 and 8. A fundamental background of the Company, research questions, research objectives, significance of the research and delineation to the scope of the research will be explained below in this chapter.

## **1.2. The Company Background**

In recent years, a lack of compliance with the environmental legislative framework which seeks to protect and promote an ecologically sustainable development was identified at the Company (that is, Eskom's distribution division in South Africa). This led to environmental liabilities which impacted on ecological integrity. In addition, the Company, responsible for producing electricity in South Africa, lacked the ability to maintain and keep their operation systems operating consistently and at satisfactory levels owing to ageing plants, electrical faults and vandalism (Newbery & Eberhard, 2008).

The Company experienced numerous environmental incidents such as veld fires, oil spillage, animal and bird interaction and the cutting down of protected trees, which resulted in environmental claims as well as costs for rehabilitation and compensation (Eskom, 2016b). Additionally, it was found that every year, the Company received environmental claims related to veld fires which were likely to occur during the August and December months.

Moreover, oil spillage incidents were reported to have occurred in the Welkom and Virginia areas (at the Free State Operating Unit). The Company designed distribution powerlines which were required to be bird-friendly in order to avoid electrocution incidents. Incidents such as these led to an environmental liability which impacted negatively on ecological integrity and resulted in the Company's loss of money due to claims and environmental remediation.

Therefore, the Company created a new electrical infrastructure, maintained and re-routed existing, decommissioned old infrastructure and disposed of waste materials, also ending activities and operations which impacted negatively on the environment (Eskom, 2014b). The Company is phasing out all hazardous substances containing PCB and replacing it with non-PCB substances to conform to international agreements, national and other pieces of legislations, including the Company's internal policies and standards (Eskom, 2015).

The Company has incorporated environmental objectives and commitment in its environmental policy to prevent pollution, promote environmental reporting and to conform to all applicable environmental legislation and other relevant requirements. This has been done to ensure that performance is measured, maintained and that continual improvement is achieved. Failure to honour these environmental obligations does not only result in sanctions, it also deprives ecologically sustainable development and benefits to the existing and upcoming generations (Eskom, 2016a).

Some of the requirements in the environmental legislative framework that the Company adheres to are summarised in Table 1.1 below. The Company has a five-level environmental legislative framework to which it subscribes, namely, international agreements, the national statutes as well as provincial, local and Company-level legislative requirements.

**Table 1.1: The five-level environmental framework to which the Company subscribes.**

<b>1. International Level</b>
<ul style="list-style-type: none"> <li>• United Nations Conference on Environment and Development, Rio de Janeiro, Brazil, 3 to 14 June 1992.</li> <li>• Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 5 April 1994.</li> <li>• Convention on Biological Diversity, 2 November 1995.</li> <li>• Stockholm Convention on Persistent Organic Pollutants, September 2002.</li> </ul>
<b>2. National Level</b>
<ul style="list-style-type: none"> <li>• The Constitution of the Republic of South Africa Act 108 of 1998.</li> <li>• National Environmental Management Act 107 of 1998.</li> <li>• National Environmental Management: Biodiversity Act 10 of 2004.</li> <li>• National veld and Forest Fire Act 101 of 1998.</li> </ul>
<b>3. Provincial Level</b>
<ul style="list-style-type: none"> <li>• Free State Nature Conservation Ordinance No. 8 of 1969. Proclamation 113 of 1994. <i>Government Gazette No. 15813</i>. 17 Jun 1994.</li> <li>• Draft Free State Nature Conservation Bill, 2007. <i>Provincial Gazette No. 24</i>. 7 Apr 2008.</li> <li>• Free State Province Standard Waste Management By-Law. <i>Provincial Notice 211</i> in Free State <i>Provincial Gazette</i> 84 of 9 December 2011</li> </ul>
<b>4. Municipal Level</b>
<ul style="list-style-type: none"> <li>• Mangaung Metropolitan Municipality: Waste Management By-Laws, Free State Provincial Gazette 60 of 25 October 2013.</li> <li>• Fire and Emergency Services By-Law 2 of 10 April 2015. PN 189.</li> <li>• Masilonyana Local District Municipal Environmental Management By-Law. PN 182.2</li> </ul>

of 10 April 2015.

- Mangaung Metropolitan Municipality (Mangaung Local Municipality) By-Laws Relating to Electricity Supply. PG 116 of 28 October 2005.

## 5. Company Level

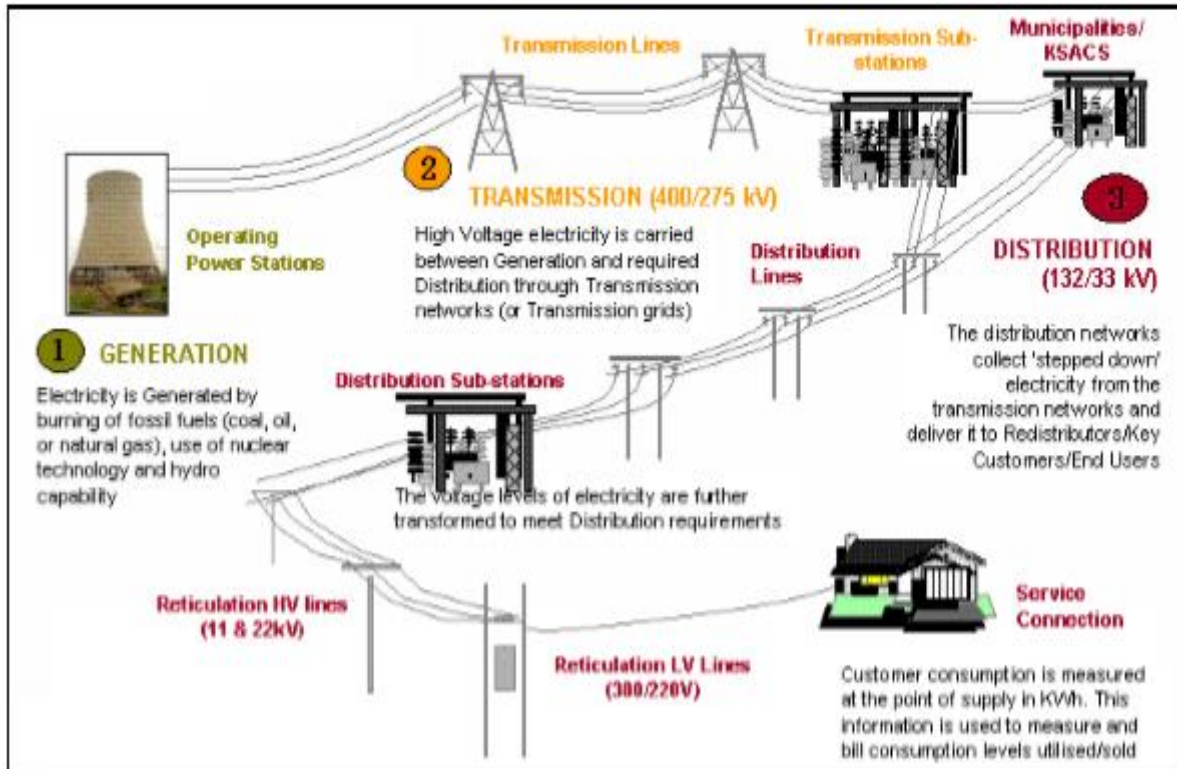
- 32-727 Safety Health Environment and Quality (SHEQ) Policy. Risk and Sustainability. Johannesburg: Eskom
- 240-101385485 Sustainability Mapping at Eskom: Eskom's Sustainable Development Framework. Climate Change and Sustainable Development. Johannesburg: Eskom
- 240-84908008 Polychlorinated Biphenyls Phase-out Standard: Eskom Research, Testing & Development. Johannesburg: Eskom.
- 32-95 Environmental, Occupational health and Safety Incident Management Procedure.
- 240-71555318 Generic EMP for Operation and Maintenance, June 2014. Johannesburg: Eskom.

**Source:** (Choksi, 1989; Annex, 2002; Paschke & Glazewski, 2006; Spector, Sjöstedt & Zartman, 1994; Van der Linde, 2006; REGION, 2006).

The Company conducted a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis on itself and the environment. The researcher analysed the weaknesses and threats which illustrate failures to meet environmental obligations that pose an environmental risk relating to environmental liability.

The weaknesses identified relate to a constrained system which comprises environmental performance, the inability to respond to changing legislation, inconsistent levels of commitment to the environment throughout the Company, the poor integration of environmental practices into operations, and inadequate and ineffective communication of key environmental issues. Threats identified include the process to obtain environmental approval, an ageing plant, limitations to natural resources such as water and the impact of climate change on the execution of the Company's activities (Eskom, 2014a).

An overview of the Company's electricity value chain is illustrated in Figure 1.1 to illustrate the link between the distribution and other divisions.



**Figure 1.1: The Company electricity value chain (Chilwane, 2011)**

Figure 1.1 illustrates the Company's electricity value chain, from the electricity generation (1: Generation Division), transmission of electricity (2: Transmission Division), Distribution Division (3) and municipalities by means of which the distribution division distributes electricity to customers, such as households. The electricity is generated at a Generation Division (Gx) from coal carried into the plant on a conveyor belt, crushed into a fine powder and burned under controlled conditions in modern boilers to a high-pressure steam, and other power (electricity) is generated through wind turbines and hydroelectric power stations (Eskom, 2014a; Eskom, 2017).

The electricity voltage is strengthened through a transformer and transported to the Tx power lines, which transmit the electricity into the transmission division substation transformers and from there, the electricity voltage is stepped down into Dx power lines and municipalities (Chilwane, 2011; Eskom, 2011).

### 1.3. Research Questions

This research has engaged in an in-depth discussion on the environmental obligations and associated liabilities for improving an ecologically sustainable development by asking the following questions:

1. To what extent does the Company comply with environmental legislation to fulfil its environmental obligations?



2. What strategy/strategies the Company has/have to prevent or minimise costs related to environmental remediation and compensation?
3. Which environmental management options the Company can use to attain ecologically sustainable development?

#### **1.4. Research Objectives**

Ecologically sustainable development is paramount and beneficial to the present and forthcoming generations. Thus, to achieve the above, the research objectives are:

1. To investigate compliance with the environmental obligations and liabilities of the Company to ensure ecologically sustainable development.
2. To determine strategies and plans the Company can use to save costs resulting from environmental remediation.
3. To assess the Company's environmental integrity.
4. To determine the best environmental management options for continually improving ecologically sustainable development.

#### **1.5. Significance of the Research**

Environmental legislation has been enacted to ensure that whoever fails to honour these obligations is held liable for improper conduct. The environmental laws are also designed to make individuals realise and respect the right of contemporary and upcoming generations with regard to ecologically sustainable development. The findings of this research will be useful for the electricity distribution sector within South Africa as well as globally, to ensure that the environment is protected, to minimise financial loss to liabilities and to ensure that ecologically sustainable development is achieved.

The Company, as a state-owned enterprise, will be able to reflect transparency in the reporting of environmental performance and environmental obligations and liabilities, which will include, amongst others, the prevention of pollution, ecologically sustainable development, compliance with applicable legislation and additional requirements for any organisation in South Africa and internationally.

Furthermore, the research will assist in governance and decision-making processes, ensuring that issues of accountability and liability are well understood in any organisation that uses or may use activities, products and services that have the potential of causing environmental degradation and hinder ecologically sustainable development.

The government, corporate citizens, non-governmental organisations and state-owned enterprises have a vital role to play in ensuring that ecologically sustainable development is achievable so that modern and forthcoming generations are not disadvantaged by their actions.

### **1.6. Delineation of the Research**

The proposed research project was limited to an analysis of the environmental obligations and liabilities of the Company to improve ecologically sustainable development. Thus, the researcher determined to what extent environmental obligations and liabilities have been met so that environmental rights for the current and future generations are upheld. The sample size and characteristics limit the generalisation of the results of other provinces.

This research project quantified its findings to identify the possible causes of failure and to fulfil environmental obligations as set out in environmental legislative frameworks to which the Company subscribes. The research excluded other departments in the Company that are not mentioned, only quantitative and qualitative research methodologies mentioned in the research methodology were used.

### **1.7. Summary**

In this chapter, a background to the research and the Company has been explained to give a clear understanding of the study. The Government have made environmental provisions in environmental legislative framework to safeguard the environment for the benefit of the current and future generation. Research questions and objectives were explained to clarify the main aim of the research and to determine whether the objectives of the research were met. Furthermore, significance of the research and delineation were explained in order to highlight the importance of the research and set limitations that were encountered during the study.

The next chapter provided more detail on the literature reviewed in connection with basic concepts of the research background from; international, national, provincial and local perspectives.

**CHAPTER ONE (2):  
Literature Review**

## **CHAPTER TWO (2): Literature Review**

### **2.1. Introduction**

In this chapter, numerous environmental legislative frameworks were reviewed to provide a clear perspective about the concepts of this research in trying to answer the research questions and objectives. Subsequently, international environmental legislation relating environmental obligations, environmental liabilities and ecologically sustainable development were addressed.

Concern about the protection of the environment during social and economic development has grown worldwide since the 1990s and has led to several initiatives being put in place to ensure sustainable development. Thus, South Africa has agreed to the United Nations Declaration on Environment and Development which was formulated at the 1992 United Nations Conference on Environment and Development (UNCED). Agenda 21, which was agreed upon, was the principal output of the 1992 Earth Summit where the key factors were to partner, conserve and manage natural resources and was further endorsed in 2002 at the World Summit on Sustainable Development held in Johannesburg in South Africa (EUROPEIA, 2007; Communication from the Commission, 2007).

In South Africa, environmental liability for damage caused to the environment is dealt with extensively by the country's environmental legislative framework, with the incorporation of other pieces of legislation. The framework points out that a potential developer should take steps to prevent or minimise damage to the environment. Such a developer may also be directed to rehabilitate the damage caused to the environment (Rabie, Blignaut & Fatti, 1994; Fuggle & Rabie, 2009).

This environmental obligation requires a director general or a provincial head of department to make any person accountable and to report any person who fails to take the measures required to investigate, evaluate and assess the impact of specific activities (South Africa, 1998a; Fuggle & Rabie, 2009).

Depending on a project's ecological threshold, environmental studies are carried out internally at the Company or subcontracted. Projects undertaken include, but are not limited to, Environmental Impact Assessment (EIA), Basic Assessment Report (BAR), Environmental Management Programme (EMP) and Desktop Environmental Screening Document (DESD). Environmental feasibility studies are important to a developer who requires environmental authorisation. The nature of the environmental feasibility studies that determine authorisation depends on the ecological threshold and type of work to be carried out.

BAR and EIA are tools used to assess the potential impact on the environment and promotes sustainability in public and private decision-making (Feris, 2010). Authorisation of environmental screening clearly sets out environmental obligations that are often expressed as conditions that

one should obey when performing environmentally authorised projects. For example, an EIA assists with the establishment of foundational conservation documents which guide the implementation of environmental management programmes (Lawrence, 1997; Paschke & Glazewski, 2006).

Some environmental obligations are expressed as general authorisations when the activity to be performed is below a certain ecological threshold and does not require environmental authorisation (Paschke & Glazewski, 2006; Van der Linde, 2006). Although these general authorisations do not require permits, it does not relieve the organisation from environmental obligations. Environmental authorisation carries the element of an environmental obligation to deter and remediate environmental degradation.

Environmental obligations are extended to the land's title holder, the person in control or the person who has the right to use the land on which pollution exists or is likely to cause environmental degradation (Rabie & Fuggle, 1998; Van der Linde, 2006). A competent authority may require that any person benefiting from such rehabilitation should, in proportions that may be negotiated, contribute to the costs involved.

According to Boyd (2002) a person who is responsible for environmental damage remains liable even when the organisation this person is involved has been sold. Such a person or organisation does not automatically escape such a liability. Subsequently, the liability will be reassigned to the acquiring organisation. The person may only avoid liability when person has legally dissolved the organisation before performance of obligation. The Polluter Pays Principle (PPP) is also important.

The PPP refers to external factors such as the hostile cost of pollution and waste where it is generally accepted that the undesirable costs of polluting the environment are not built into the product's cost. This means that those who have caused, are causing or may cause environmental degradation should bear the full environmental and social costs of their environmentally undesirable activities (Rabie & Fuggle, 1998).

The PPP is achieved by setting minimum rules on liability for environmental impairment (Fuggle & Rabie, 1998; Kidd, 2010; Humby, 2013). The emphasis on environmental obligations and liabilities is specified to include individual liability, where any director, employee and subcontracted person who fails or neglects to act on behalf of an employer, shall be found guilty and penalised as if he/she were the employer (South Africa, 1998a; South Africa 1998c; Humby, 2013).

There are three types of liability administrations, including public liability within sectorial environmental laws, civil liability and criminal liability. Civil liability is a responsibility which comes into action if damage is caused. However, liability comes from the legal duty to maintain the environment and prevent the source of the impact (BrunnÉee, 2004; Stylou, 2015). Criminal liability is a liability which arises where a person is guilty of illegal conduct or omits to comply to what is permitted by law (Pitt & Groskaufmanis, 1989; Bucy, 1990).

Bond and Morrison-Saunders (2009) argue that South Africa faces challenging sustainability difficulties, although the country has embraced the concept of sustainable development. Hopwood, Mellor and O'Brien (2005) explain that, in addition to human needs, a thoughtful ecologist's key concern is the environment, with the emphasis on the fundamental value and needs of nature and the environment.

In South Africa, there is no supreme environmental liability system covering all environmental elements within an environmental legal framework. For this reason, the beneficial use of environmental resources serves the public's interests and the environment must be guarded as a common heritage (South Africa, 1996; Paschke & Glazeskwi, 2006). It is for this reason that anyone who intends to do any development, construction, expansion, decommissioning or refurbishment project that has the potential of causing a negative impact on the environment, must conduct an environmental feasibility or screening study which seeks to identify the impact on the environment and avoid or mitigate the impact where possible.

Gebers (1998) and Mortensen (2001) explain that an environmental obligation is an agreement between individuals or associations or companies or private and public authorities with the intention of safeguarding the environment. These environmental obligations are intended to ensure that pollution or any form of environmental degradation is prevented from occurring, spreading and recurring as prescribed by law.

Furthermore, where pollution cannot be stopped, it must be reasonably reduced, while a clean-up of such pollution and reasonable costs may be recuperated from a polluter or any person responsible for such pollution (Paschke & Glazeskwi, 2006; Van der Linde, 2006).

Environmental management aims at controlling the Company's activities, products and services that can have an undesirable influence on the environment. The controlling requirements are obligations which the Company must honour. This agrees with South Africa (1998b) which explains that all people who start a fire on their land or on whose land fire may spread should have a fire break wide enough to stop the fire. This helps involved parties to take reasonable measures to prevent a fire.

The Company under investigation distributes electricity and is therefore obliged to take practical steps to ensure that the waste generated is disposed of in an environmentally safe manner. Failure to honour these obligations results in environmental liability as determined by the environmental legislative framework in terms of the National Environmental Management: Waste Act, 2008 (South Africa, 2008). Therefore, a court decision made in relation to significant pollution that happened prior to environmental legislation taking effect must ensure that parties take reasonable measures to prevent and rehabilitate the polluted area (Bareki, 2006).

Additionally, the Company has an environmental policy which set its principles and commitments to protect the environment and which includes environmental compliance obligations. Thus, every

person who has caused, is causing or may cause environmental degradation is legislatively obliged to take the necessary measures to prevent such environmental degradation. Where people fail to take the necessary measures to honour environmental obligations, they will be held liable for paying the costs for remediation of the environment to return it to its original state.

Failure to meet environmental obligations deprives ecologically sustainable development. Ecologically sustainable development seeks to balance environmental protection while promoting social and economic development. The Company needs to reconsider its environmental obligations while conducting its business operations and maintenance to ensure ecologically sustainable development.

The Company has an environmental policy which prescribes internal environmental procedures and subscribes to South Africa's national, provincial and local environmental legislative frameworks as well as environmental international treaties. This requires the organisation to conform to certain standards such as Environmental Management Systems and to comply with all environmental obligations within these relevant guidelines and legislation. This is to trace and continually improve environmental performance as stipulated in the Company's environmental policy. Environmental management cooperation agreements have also been used as tools to improve environmental performance (Fischer, 2005).

## **2.2. Environmental Legislation**

### **2.2.1. International / United Nations Organisations**

The United Nations consists of very prominent divisions such as the United Nations Environmental Programmes (UNEP), United Nations Division for Sustainable Development (UNSD) and the United Nations Educational Scientific and Cultural Organisation (UNESCO), all of which monitor the international community with regard to environmental practices. UNEP seeks to provide leadership and encourage partnerships in caring for the environment by inspiring, informing and enabling nations and people to improve their quality of life without compromising that of future generations (Lanchbery, 2006; Sand, 2013).

UNSD has divisions which seek to promote sustainable development through technical collaboration and capacity building at international, regional and national levels. UNESCO pursues the United Nations Millennium Development Goals (UNMDG) to help countries implement a national strategy for sustainable development by 2005 and to reverse the trends in the loss of environmental resources by 2015.

Sustainable Development Goals originated from the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012 with the main objective being to set universal goals that meet the urgent environmental, political and economic challenges facing the world. Recently, 17 Sustainable Development Goals were endorsed as a universal call to action to end poverty, to protect the planet and to ensure that all people enjoy peace and prosperity (Ford, 2015).

### 2. 2. 2. International Conventions and Treaties

In the past, there were numerous international treaties aimed at protecting the environment, of which South Africa is a signatory. These international treaties focus on numerous environmental issues in which global action has been deemed necessary (Doc, 2002; Lanchbery, 2006; Sand, 2013). Barnard (2003) specifies that to comprehend the source and development of international conventions and treaties dealing with environmental problems, they ought to be considered within a comprehensive perspective.

Table 2.1 below illustrates some international treaties to which South Africa is a signatory. For this reason, the Republic of South Africa acquired an environmental obligation to ensure that the country upheld the conditions of these treaties. The conditions of these treaties come in a form of environmental obligations.

**Table 2. 1: Various international conventions applicable to the Company’s operations**

Conventions or Treaties	Purpose
Stockholm Declaration	International convention which was attended by almost all nations which aimed at states cooperating and developing international law that deals with environmental liability issues caused by trans-boundary activities and compensation for the people subjected to pollution or other environmental damage (Barnard, 2003).
Brundtland Commission	Provided a conceptual framework for the implementation of environmental principles, presented the concept of sustainable development and served as a basis for the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 (Barnard, 2003).
United Nations Conference on Environment and Development (UNCED), 1992	Aimed at providing awareness of the concept of sustainable development and emphasises the need to integrate environmental and developmental issues. According to Barnard (2003), South Africa has a local agenda 21 which deals with sustainability at local authority level.
The World Summit on Sustainable Development held in Johannesburg in September 2002.	Aimed at overcoming the complications in terms of achieving sustainable development and to generate initiatives that will yield good results and improve



Conventions or Treaties	Purpose
	people's lives while protecting the environment.

**Sources:** (Kummer, 1999; Barnard, 2003; Wapner, 2006)

The international treaties tabulated above in Table 2.1, also assign some environmental obligations to the Company's distribution divisions and any organisation within the Republic of South Africa to adhere to when performing its business practices. The failure to adhere to these environmental obligations leads to an environmental liability which may come in the form of compensation, a fine or imprisonment. Moreover, failure to adhere to environmental obligations prevents the improvement of ecologically sustainable development.

### 2. 2. 3. The National Context of South Africa's Environmental Legislation

The Republic of South Africa has established and enacted several environmental laws with the aim of protecting the environment, while promoting economic and social development. These laws include national legislation applicable to all nine (9) provinces in the Republic of South Africa. It is mandatory for the distribution division to continually comply with the national environmental legislation. Below, Table 2.2 illustrates South Africa's national environmental legislative framework and sub-sections which seek to safeguard the environment and improve ecologically sustainable development by specifying environmental obligations.

**Table 2. 2: National Environmental Legislative Framework**

National Environmental Legislation	Specific Section(s)
The Constitution of the Republic of South Africa Act 108 of 1996	<p><b>Section 24: Environmental</b></p> <p>Everyone has the right –</p> <p>(a) To an environment that is not harmful to their health or well-being; and</p> <p>(b) To have the environment protected, for the benefit of the present and future generations, through reasonable legislative and other measures that –</p> <p>(i) Prevent pollution and ecological degradation;</p> <p>(ii) Promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p>

National Environmental Legislation	Specific Section(s)
National Environmental Management Act 107 of 1998	<p><b>Section 28: Duty of care and remediation of environmental damage.</b></p> <p>1. Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.</p>
National Environmental Management: Biodiversity Act 10 of 2004	<p><b>Section 102 (1): Penalties</b></p> <p>A person convicted of an offence in terms of section 101 is liable to a fine not exceeding R10 million, or to imprisonment for a period not exceeding ten years, or to both such a fine and such imprisonment.</p>
National Environmental Management: Air Quality Act 39 of 2004	<p><b>Section 2 (a) Object of Act</b></p> <p>The act must also provide reasonable measures [section 2(a)] for:</p> <p>(i) The protection and enhancement of the quality of air in the Republic</p> <p>(ii) The prevention of air pollution and ecological degradation</p> <p>(iii) Securing ecologically sustainable development while promoting justifiable economic and social development.</p>

**Sources:** (South Africa, 1996; South Africa, 1998a; South Africa, 2004a, South Africa, 2004b)

#### 2. 2. 4. The Provincial Context of Environmental Legislation

The Free State Provincial government has established and enacted the provincial nature conservation ordinance which aims at the conservation of flora and fauna. The ordinance applies to the province within which the Company's distribution division operates and maintains its electrical equipment to ensure proper distribution of electricity. Below is Table 2.3, which presents some environmental provincial legislation which seeks to protect the environment while pursuing economic and social development.

**Table 2. 3: Provincial environmental legislation applicable to the Company's operations**

Provincial Environment Legislation(e)	Purpose
Free State Nature Conservation Ordinance No. 8 of 1969	Provide for the conservation of fauna and flora and the harm of animals causing damage and for matters incidental thereto.
Free State Province Standard District Municipal Environmental Management By-Law. <i>Provincial Notice</i> 182 in Free State <i>Provincial Gazette</i> 80 of 9 December 2011	The purpose of these By-laws is to enable the Council to set minimum environmental health standards to prevent disease, prolong life, protect and promote the health and well-being of people in the municipal area
Free State Province Standard Waste Management By-Law. <i>Provincial Notice</i> 211 in Free State <i>Provincial Gazette</i> 84 of 9 December 2011	The main objects of these By-laws are enhancing sustainable development, endeavour to minimise the consumption of natural resources, promote and ensure an environmentally responsible municipal service and commercial service.

**Sources:** (Free State (South Africa), 1969; Free State (South Africa), 2011a & Free State (South Africa), 2011b).

### **2. 2. 5. The Municipal Context of Environmental Legislation**

Some municipalities have enacted environmental by-laws which aim at protecting the environment, specifically environmental obligations and liabilities promoting ecological sustainable development. The Company, which operates within those municipal boundaries, is obliged to adhere to enacted pieces of legislation. Failure to uphold this municipal legislation leads to the Company being environmentally liable and must rectify the wrongdoing.

The failure to uphold environmental obligations also leads to a negative impact on the environment which, in turn, denies the continual improvement of ecologically sustainable development. Table 2.4 below illustrates some examples of municipal by-laws enacted by different municipalities within which the Company operates.

**Table 2. 4: Municipal By-Laws applicable to the Company's operations**

Municipal By-Laws	Relevant Sections
<p>Matjhabeng Local Municipality Dumping and Littering By-Law: Published in <i>Free State Provincial Gazette</i> 100 of 28 November 2008</p>	<p><b>Section 4: Dumping and Littering</b></p> <p>(3) A person who owns land or premises, or who is in control of or has a right to use land or premises, may not use or permit the use of the land or premises for unlawful dumping of waste and must take reasonable steps to prevent the use of the land or premises for this purpose.</p>
<p>Xhariep District Municipality: District Municipal Environmental Management By-Law. PN 182 in <i>Free State Provincial Gazette</i> 80 of 9 December 2011 and adopted by <i>Free State Provincial Gazette</i> 58 of 19 September 2014</p>	<p><b>Section 4: Application of principles</b></p> <p>(1) Environmental management must place local people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.</p>
<p>Mangaung Metropolitan Municipality: Waste Management By-Laws <i>Free State Provincial Gazette</i> 60 of 25 October 2013.</p>	<p><b>Section 5: Obligations of waste generators:</b></p> <p>(1)(a) Every person has an obligation to manage any waste generated by his or her activities or the activities of those persons working under his or her direction in such a manner that the waste does not cause harm to human health or damage to the environment.</p>
<p>Masilonyana Local District Municipal Environmental Management By-Law. PN 182 in <i>Free State Provincial Gazette</i> 80 of 9 December 2011 and adopted by <i>Free State Provincial Gazette</i> 2 of 10 April 2015.</p>	<p><b>Section 4: Development must be socially, environmentally and economically sustainable:</b></p> <p>(2)(a) Sustainable development requires the consideration of all relevant factors including, and not limited to,</p> <p>(i) The disturbance of ecosystem and of loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied</p> <p>(viii) Negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.</p>

**Sources:** (Free State (South Africa) 2008; 2013; 2014; 2015).


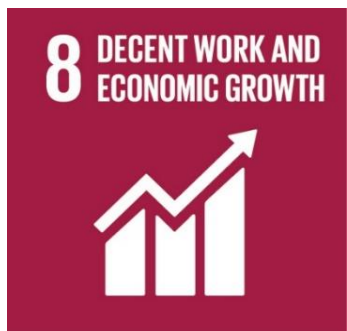
## 2. 2. 6. International Context of Environmental Legislation


According to Sands and Peel (2012), international environmental legislation is a division of public international law at preliminary phases of everyday development. The international environmental legislation seeks to regulate and introduce environmental obligation to prevent transboundary negative effects of pollution on the environment. The presumed guidelines of customary international environmental legislation reproduce behaviour reliabilities and predict the purpose of the legal existence (Bodansky, 1995).

Worldwide, environmental threats are immense and require international states to meet a particular goal, such as, to combat environmental issues such as biodiversity loss, environmental pollution and climate change. The international community meets and establishes a constitution of international environmental legislation in a form of an international treaty, such as those mentioned in Table 2.1 above.

These environmental treaties place an environmental obligation on every state and its organisation to ensure environmental compliance with the requirements or conditions agreed upon in the international treaty (Bodansky, Brunnee & Hey, 2008). The consensus with international environmental conventions is a vital principle for the country's national legislation. The country has to establish Sustainable Development Goals in ensuring sustainable development within the country in line with the international treaty on sustainable development. The Company has obligations related to the environment to ensure that its operations are in line with Sustainable Development Goals as indicated in Table 2.5 below in no numerical order of importance.

**Table 2. 5: Sustainable development goals applicable to the Company**

Icon	Goals	Objective(S)
 <p><b>7 AFFORDABLE AND CLEAN ENERGY</b></p>	<p><b>Goal 7:</b> Ensure access to affordable, reliable, sustainable and modern energy for all.</p>	<p><b>7.1</b> By 2030, ensure universal access to affordable, reliable and modern energy services.</p> <p><b>7.2</b> By 2030, increase substantially the share of renewable energy in the global energy mix.</p>
 <p><b>8 DECENT WORK AND ECONOMIC GROWTH</b></p>	<p><b>Goal 8:</b> Promote inclusive and sustainable economic growth, employment and decent work for all.</p>	<p><b>8.4</b> Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation in accordance with the 10-year framework of programmes on</p>

Icon	Goals	Objective(S)
		sustainable consumption and production with developed countries taking the lead.
 <p>The icon for Sustainable Development Goal 15, 'Life on Land', is a green square. It features the number '15' in large white font, followed by the text 'LIFE ON LAND' in smaller white font. Below the text is a white silhouette of a tree with a cloud above it and two birds flying to the right. At the bottom of the square are two horizontal white lines representing a ground surface.</p>	<p><b>Goal 15:</b> Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.</p>	<p><b>15.1</b> By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, forest, wetlands, mountains and drylands in line with obligations under international agreements.</p> <p><b>15.4</b> By 2030, ensure the conservation of mountain ecosystems, including their biodiversity to enhance their capacity to provide benefits that are essential for sustainable development.</p>

**Source:** (Ford, 2015; Eskom, 2016a).

### 2.3. Summary

This chapter provided an overview of the literature related to the analysis of environmental obligation and liabilities to improve ecologically sustainable development. An overview of environmental obligation and environmental liability explains that the term 'liability' refers to being legally responsible and when a person is at fault, that person becomes liable for his or her actions or omissions thereof.

Environmental liability is attributed to a failure to honour environmental obligations for the environmental damage caused, either in the past, present or future. The failure to adhere to environmental obligation and liability becomes apparent and it deprives the improvement of ecologically sustainable development.

For this reason, a founding principle of ecologically sustainable development and regulation is that environmental rehabilitation costs of environmental damage should be paid by those who cause the damage. The core basis of environmental obligation and liability is in accordance with the Polluter Pays Principle to improve ecologically sustainable development continually.

It is apparent from the literature review that the concept of the present environmental obligations and liabilities in the legislative framework applicable to the Republic of South Africa and its people,

was established to prevent pollution and environmental degradation, as well as to ensure that ecologically sustainable development is improved.

In the next chapter, research design and methodology are explained to provide the approach to which the research was carried out.

**CHAPTER THREE (3):  
RESEARCH DESIGN AND METHODOLOGY**



## **CHAPTER THREE (3): Research Design and Methodology**

### **3.1 Introduction**

This chapter deals with the approach of the research by addressing the methodology that was used to carry out the research. Both qualitative and quantitative methods were used and explained below. The methods comprise of data collection, correlation test, analysis, reliability and validation of the data to ensure that collected data is accurate and correct.

### **3.2 Research Design**

Research design is a framework for conducting research with a determined mechanism over issues that may hinder the validity of the research findings (Burns & Novelli, 2008). Thus, Kumar (2011 & 2014) describes a research design as a concrete strategy or plan that is applied by the researcher to realistically respond to questions/ statement accurately, validly, objectively and equitably without prejudice.

This research involves a combination of quantitative and qualitative research methods and consists of the collection and analysis of statistical data, questionnaires and site visits. The aim of this research is to analyse environmental obligations and associated liabilities of the Company's distribution division to improve ecologically sustainable development. Therefore, it is vital for any organisation to understand its environmental obligations and liabilities as well as to take the necessary responsibility for their failure or possible environmental degradation. Thus, improving the Company's environmental compliance with legislation, leads to improving ecologically sustainable development.

The research design provides a detailed plan of how different research methods and procedures mentioned in this study are executed. It enables data collection, analysis, interpretation and presentation in a manner that aims to provide a meaningful contribution to the research project.

Two variables were established for this research, namely,

- Environmental Obligation = Independent variable (X)
- Environmental Liability and Ecologically sustainable development = Dependent variables (Y)

Variable is an observed phenomenon that takes on diverse values. It is a logic grouping of attributes and attributes are characteristics that describe an object such as age, environmental beliefs (Flannelly, Flannelly & Jankowski, 2014).

Independent variable (X) is the variable that is manipulated by the researcher to determine the possible effect or brings about a change in an observed occurrence which creates the relationship with the independent variable (Kumar, 2011; Kumar, 2014). For this reason, the researcher is interested to know how the independent variable affects other variables.

Dependent variable (Y) is the variable on which the effect is focussed. It observes and measures the affected independent variable (Kumar, 2001; Welman, Kruger & Mitchell, 2005). An assessment of the status before and after environmental liability and ecologically sustainable development is determined by the environmental obligation posed which then clarifies whether there is a benefit or not.

The relationship and dependability between two variables is essential. Where there is no relationship between two variables, the effect is then rejected. An assessment of the status before and after environmental liability and ecologically sustainable development is determined by the environmental obligation posed which then clarifies the benefit or the loss on the environment.

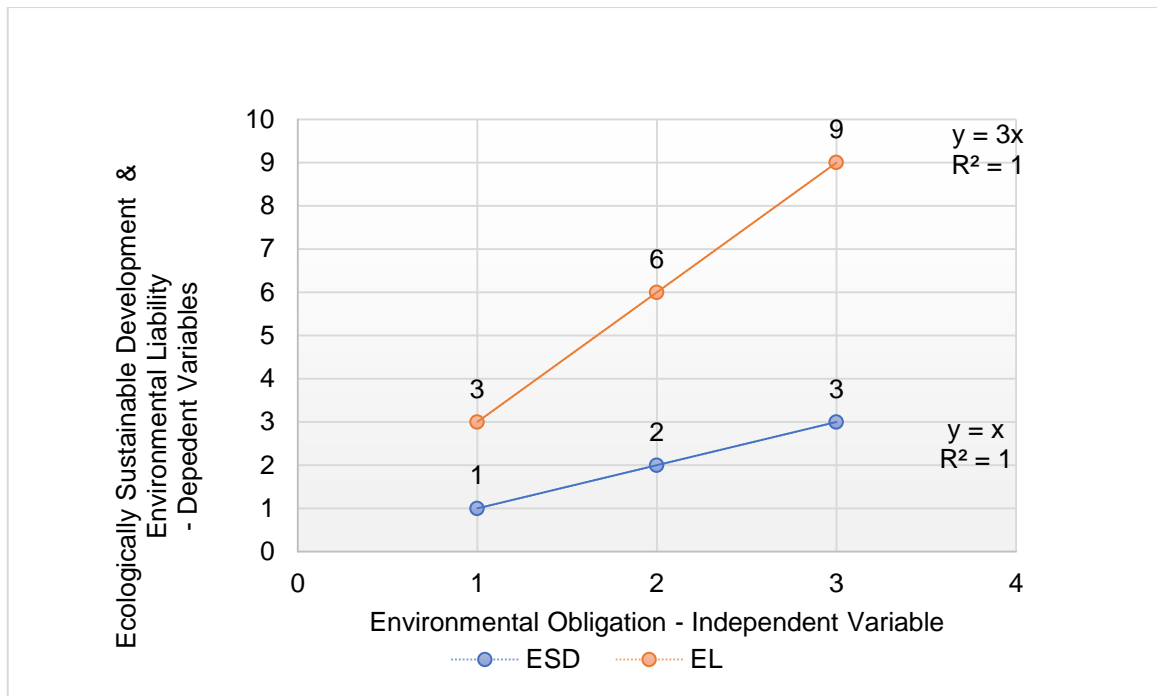
### **3.3 Variables Correlation Test**

A correlation analysis was determined by correlation coefficient test, where correlation coefficient of +1 indicates a positive relationship, correlation coefficient of 0 indicates no relationship and correlation coefficient of -1 indicates a negative relationship. EO (X) was assigned numerical values indicating environmental incident leading to an environmental obligation.

ESD (Y) was assigned numerical values indicating the impact on the environment caused by the environmental obligation. EL (Y) was assigned numerical values indicating environmental liability caused by the environmental obligation.

When environmental incident occurs, there is environmental obligation caused to prevent the detrimental impacts on the environment (damage ecological integrity) and environmental liability (fine, clean-up or both) costs involved. The numerical values assigned to both independent and dependent variables illustrate the correlation coefficient between variables. The correlation coefficient was calculated using Microsoft excel. A correlation coefficient of 1 was observed which indicate positive correlation between variables.

As variable X increases, variable of Y increases. As variable X decreases, variable Y decreases. Figure 3.2 illustrates the correlation analysis using R square value.



**Figure 3.1: Variable correlation analysis test**

The correlation analysis test illustrated in figure. 3.1 shall be read in conjunction with table 3.1 which indicate correlation coefficient between the independent and dependents variables for this research. The correlation coefficient (CoE) is 1 which indicates a positive relationship between variables. Table 3.2 present the variable correlation test undertaken to determine how dependent variable correlate with the independent variables.

**Table 3. 1: Variable(s) correlation coefficient test**

Variable (s)	Value(s)			Coefficient (CoE)
Environmental Obligations (X)	1	2	3	1
Ecologically Sustainable Development (Y)	1	2	3	
Environmental Obligation (X)	1	2	3	1
Environmental Liability (Y)	3	6	9	

### 3. 4 Research Methodology

Research methodology is a methodical technique to study a research problem as it offers a direction to the type of data involved in a research problem and the realistic approach to collect, analyse and interpret that data (Leedy & Ormrod, 2005; 2009; Wodak & Meyers, 2009). The methodology followed by this research was structured to respond to the research questions and achieved research objectives according to the title of the research, “*The analysis of environmental*

*obligations and liabilities of a distribution division to improve ecologically sustainable development.”*

Calmeyer *et al.*, (2011) and Mouton (2011) explains that qualitative and quantitative methodologies are two fundamental methods that inform a research project. It is for this reason that the researcher has selected both quantitative and qualitative methods for data collection, analysis and interpretation of the results. The quantitative method was carried out through a data collection technique which uses SAP EH&S Incident Management software and Likert Scale research questionnaires, while the qualitative method was carried out using a site visit observation data collection technique.

According to Kumar (2011; 2014) and Silverman (2013), using both quantitative and qualitative research methods has its advantages and disadvantages. Some of the advantages include, but are not limited to, enhancement of research possibilities, enrichment of data and the collection of additional research evidence, while disadvantages include additional data which require more work and resources as well as diverse skills for resolving discrepancies in data challenges.

### **3. 2. 1. Qualitative Research Methodology**

The qualitative method is a structured approach that can help guarantee a correspondence of data amongst different sources and researchers which may lead to the ability to answer different questions (Maxwell, 2008 & 2010). It is a technique where the quality of observations can be described in words. According to Dickson-Swift *et al.*, (2007), a qualitative research is established in an explanatory pattern investigating nature, thus assisting researchers to gain information about an area in which little is known.

Kumar (2011 & 2014) and Silverman (2013) explains that qualitative methodology is entrenched in the idea of observation which follows an open, flexible and unstructured approach to analysis and aims to discover diversity, with an emphasis on description and the narration of perceptions and experiences. Findings are communicated in a descriptive manner. Qualitative methodology seeks to understand human behaviour and the reasons that influence such behaviour. It is sensitive to human situations and involves emphatic dialogue with studied subjects as it is a progressive research method (Kvale, 1996 & 2006).

The qualitative method uses observations such as on-site visits with the purpose of exploring and understanding the attitudes, opinions, feelings and behaviour of individuals (Henning, Van Rensburg & Smith, 2004; Johnson & Christensen, 2008; Du Plooy, 2009; Badera & Kocoń, 2014).

In the current study, this methodology was used to verify data gathered through methods such as SAP EH&S Incident Management Systems and Questionnaires used in the quantitative methodology about the environmental obligations and liabilities to improve ecologically sustainable development. This seeks to link the statistical data representative of previous occurrences collected using quantitative methods to visible and new tangible data collected during site visits.

A site visit is a reliable approach which enables the researcher to visit the site where the work is conducted and observe where and how people fail to perform their tasks as required (Cooper, Schindler & Sun, 2006). For this reason, site visits have been conducted as part of qualitative methodology to collect data and make observations to link the SAP EH&S Incident Management data and questionnaires to make an informed scientific argument for discussions on whether the environmental obligations such as the remediation of environmental degradation as prescribed by environmental legislation are fully complied with or not.

### **3. 2. 2. Quantitative Research methodology**

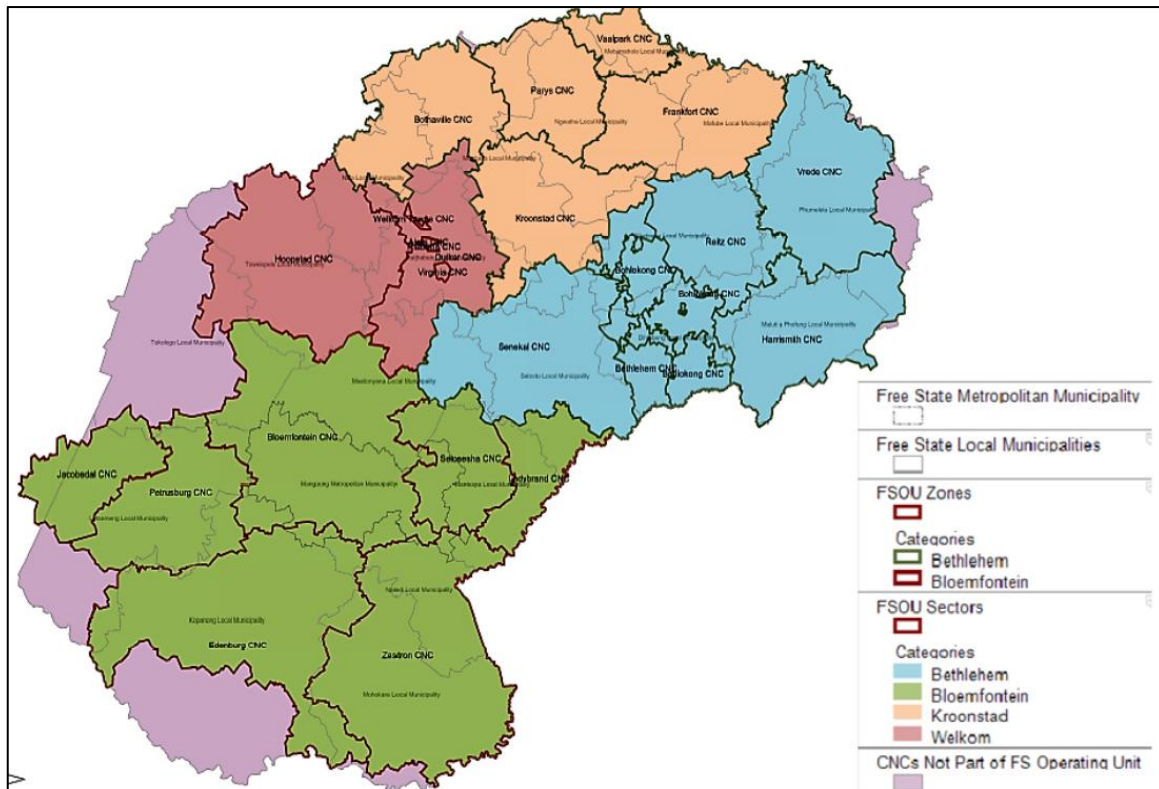
A quantitative research methodology is an organised and representative study of statistical occurrences using statistical analysis. It is the study in which the quality of the observations can be explained in numbers using statistical interventions. It is entrenched in the idea of rationalism and follows a structured and predetermined set of procedures to explore and aims to quantify the extent of variation in a phenomenon as it provides important validity and reliability of findings (Kumar, 2011 & 2014).

The quantitative method is used to assess and quantify the effects of environmental obligations and liabilities and assists in making predictions as to ecologically sustainable development (Vermeulen, 2005; Nabileyo, 2009; Kidd, 2010). For this reason, the quantitative method is important to demonstrate all environmental obligations as well as liabilities undertaken or omitted by the Company to improve ecologically sustainable development

### **3. 5 Sampling Methodology**

Sampling methodology is a technique used to decide on a defined population and entails the gathering of several units of what defines the research project's population (Creswell *et al.*, 2007; Vijayalakshmi & Sivapragasam, 2008). Kumar (2011) and Silverman (2013) explains that a sampling methodology is used to select a smaller sample from a bigger group to develop the basis for calculating the occurrence of an undisclosed portion of data and a result regarding the bigger population.

The Company has four main departments, namely, Asset Creation (AC), Operations and Maintenance (O&MM), Business Integration Performance Management (BIPM) and Safety, Health, Environment, Quality (SHEQ) in the distribution division in the Free State Operating Unit (FS OU) (Figure 3.2) and (Addenda 6).



**Figure 3. 2: Free State Operating Unit**

A random sampling approach was applied in this research where site visits and questionnaire recipients were chosen indiscriminately. Sampling is an approach to selecting respondents or informants from many sources such as people, articles and documented materials (Leedy & Ormrod, 2009). A random sample delineates the nature of the population and all members have an equal chance of being selected (Marshall, 1996).

Environmental incidents are based on reported environmental incidents and claims received. For this reason, the incident will cover all sectors which were examined according to the type of environmental incidents and financial year. This sought to determine the type of environmental obligations and associated liabilities.

The environmental incidents were drawn from the SAP EH&S Incident Management software program for the period of 01 April 2014 to 31 August 2017. Environmental Claims incidents logged by public claims committee were for the period from 01 January 2014 to 31 December 2015. Six (6) site visits were conducted between 01 April 2016 and 31 March 2017 by the researcher.

### 3. 6 Demographic of the sample population

The research focused mainly on the Operations and Maintenance Department due to the nature of business activities which interact directly with the environment. The Customer Network Centres, Power Plant Maintenance Department and the Energy Protection Department were sampled for this research. The sectors consist of 29 Customer Network Centres (CNC), three Energy

Protection (EP) and three Power Plant Maintenance Departments (PPM). The Bethlehem sector consists of six CNCs; Bloemfontein comprises ten CNCs; Welkom comprises eight CNCs; while Kroonstad constitutes five CNCs.

Other departments were not sampled as it would be impossible to conduct the research in every department, taking into consideration the timeframe for this research. The selection of departments was based on those anticipated to have a significant environmental impact derived from its activities, products and services and those shown to have environmental incidents as per the SAP EH&S Incident Management database.

The research questionnaires were distributed to 35 senior supervisors and eight works coordinators across the distribution division. Research questionnaires were distributed to the target personnel only as they were identified as the more experienced and knowledgeable respondents in their departments. The total number of personnel for all the three departments across the sector amounted to 35.

The sampled areas are positioned within four different sectors or geographic locations within the Free State province. Due to the timeframes and geographic setting of the study area, the research sampled the targeted 85% of the personnel across the sectors.

Where the senior supervisor was not available on site, a technician or works coordinator would get full delegation of authority and such person would then be included in the sampling. For this reason, the sample provides a good 100% confidence interval of the sample size to ensure that the research can be conducted successfully

According to Nakagawa and Cuthill (2007), the confidence interval is the range of values that comprises the population or a true value projected by a confident statistic with a given probability. The presumption is that the confidence value of the population provides a 15% chance of it being wrong.

There are four sectors and only three sectors were targeted to receive at least one site visit. The three sectors where site visits were undertaken were randomly selected and this amounted to 75% of the four sectors. To enable the research to be carried out accurately and yield a realistic result, it is vital to sample a small size and examine the objectives of the research, especially if the activities or practices are the same. Schönbrodt and Perugini (2013) argued that the level of precision can only be achieved by a relatively small number of high-budget studies.

### **3.7 Data Collection and Analysis**

Data collection involves first-hand gathering of primary data through site visits and secondary data through extraction of available data on the database (Kumar, 2014). A site visit involves observation by the researcher who is participating in the activities through asking questions for clarity during the site visit.

EH&S Incident Management software was used to retrieve all environmental incidents reported and those established during assessments and audits. An environmental incident is monitored and managed through its life-cycle until the recommendations to ensure a duty of care and remediation of environmental effects are fully implemented.

A questionnaire was used to collect data about the participants' degree of agreement with statement provided. According to Anseel *et al.* (2010), working respondents that have email access may respond faster through emails than non-working respondents.

Environmental claim financial data was collected from data retrieved from the public claims committee meeting. A site visit was undertaken to collect qualitative data about the environmental incidents that occurred in the Company and measure undertaken to address environmental obligations, liability to improve ecologically sustainable development.

Data were collected using an SAP Environmental Health and Safety (EH&S) Incident Management System and Questionnaires which were circulated in the distribution division to give an indication of environmental obligations and liability to improve ecologically sustainable development in four sectors. According to Marshall (1996), a quantitative methodology illustrates some numeric variables of the sample of the population concerned.

SAP EH&S Incident Management refers to software that is used to focus on an environmental, health and safety product life cycle. It is used to capture, store and withdraw data related incidents that occur at a specific time and that are recorded on the system. It is used to continually track and trace the incident and manage it from the date it was captured and processed and includes the management measures implemented, until the incident is fully managed and closed (Abele *et al.*, 2006; Butler & McGovern, 2012).

The software assisted in performing an analysis of the environmental obligations and liabilities based on the performance or omission of incidents that occurred in 2014, 2015, 2016 and until July 2017. The reason for these dates is to enable the researcher to quantify the collected environmental incident statistics. This was demonstrated in the form of graphs and pie charts, using Microsoft Excel. Graphs and pie charts were developed after all incidents have been drawn from the Company's SAP EH&S Incidents Management System and questionnaires to illustrate the research findings.

A questionnaire is a set of questions that are either or both open-ended and closed ended, which can provide the researcher with the ability to collect data without his/her physical presence and subsequent influence on the participant. This is achieved by sending questionnaires via email. Email is cheaper, takes little time and is simple to manage as it can be distributed to the participants without delay (Leedy, 1989 & 1993). The questionnaire tests the participant's degree of agreement with the statement and even affords an opportunity to supply a comment (Leedy, 1989; Allen & Seaman, 2007).



Open-ended and closed-ended question techniques were incorporated in the questionnaire as a data collection method. In an open-ended question, a participant is not subjected to predetermined answers while in a closed-ended question technique; the participant is restricted by predetermining the responses. A structured questionnaire was distributed via email to the participants with easy internet access and by means of physical hand-outs to those without email access during site visits in the four sectors.

The respondents were made up of 35 senior supervisors and eight works coordinators. The purpose of the questionnaire was to assess their understanding of and experience with the environmental liabilities and obligations of the Company to improve ecologically sustainable development.

The statements in the questionnaire to collect the data for the research used the Likert scale method. The Likert scale method involves a series of statements where participants must rate their responses to evaluate the questions (Vogt, 1999). A Likert scale is a method used to measure perceptions by providing participants with a statement, requesting them to state the extent to which they agree or disagree with the statement (Barua, 2013).

The data collected through sites visits, questionnaires, environmental claims and the SAP EH&S Incident management system (Berg *et al.*, 2004) were analysed. For this research, a descriptive statistical method was used to describe, illustrate and summarise the collected data (Berg *et al.*, 2004).

The results are presented in the form of graphs to provide clear, correct and user-friendly representations. Microsoft Excel was used to structure collected data to present it in a precise and coherent mode where meaningful trends are illustrated. Bernard (2011) explains acceptability as correctness and reliability of instruments, data and findings during research. The results will be presented, analysed and discussed in the next chapter to provide a clear outcome of the research. Results are illustrated in the form of tables and graphs and discussed accordingly in Chapter 4

The basis for analysis is to analyse the relation between the independent variable (environmental obligation) and dependent variable (environmental liability and ecologically sustainable development). According to O'Connor and Gibson (2003), an effective analysis is critically assisted by data representations that are focused enough to permit the viewing of a full set of facts in one location and systematically arranged to answer the research questions and objectives.

### **3. 8 Research Questionnaires**

In this study, 35 research questionnaires were distributed via email to 35 senior supervisors and eight works coordinators in the distribution division. Twenty-six supervisors and three works coordinators respondent to the questionnaires. Some of the respondents did not participate in the research and when called to inquire about response, they said they were busy and never replied back which demonstrated their unwillingness to participate in the research. Due to the time

allocated for the research, the researcher progressed with the data from all the responded participants.

To commence with a research study, academics depend on the willingness of respondents to respond to the questionnaire and not all respondents included in the sample are willing to complete the questionnaire (Baruch, 1999; Sax et al., 2003; Baruch & Holton, 2008). For this reason, the researcher did not have control over who responded and who did not respond.

The signed questionnaires were folded and put away to ensure that the questionnaires remained anonymous. The researcher was the only person who had access to the documents which contained people's names. Respondents were assured that the work would be treated with the utmost confidentiality and that their names had not been recorded for them to provide authentic responses. The data were analysed, and response rates are illustrated in Table 3.2 below.

Table 3. 2: Research questionnaire response rate

<b>Respondents</b>	<b>Distributed Questionnaires</b>	<b>Returned questionnaires</b>	<b>Response Percentage (%)</b>
Works Coordinators	<b>8</b>	<b>3</b>	<b>37.5%</b>
Senior Supervisors	<b>35</b>	<b>26</b>	<b>74.28%</b>
Combined	<b>43</b>	<b>29</b>	<b>67.44%</b>

As illustrated above in Table 4.1, the response rate of 37.5%, 74.28% and 67.44% allows the researcher to conclude that the results are satisfactory, valid and acceptable. This is supported by Gillham (2000), who states that when the response rate is less than 30%, the value and validity of the methods and results are questionable. Therefore, the acquired response percentages illustrated above in Table 4.1 are valid and acceptable.

The questionnaire responses were divided in three categories, namely environmental obligations, environmental liabilities and ecologically sustainable development for answering the objectives of this study that seek to analyse environmental obligations and associated liabilities to improve ecologically sustainable development.

There were 17 statements provided in the questionnaire. Analysis of the answers was undertaken by grouping the answers according to the statements that related to environmental obligations followed by environmental liabilities and then ecologically sustainable development to attain the objectives of the research. Each of these categories will be discussed in more detail at 4.2.2, 4.2.3. and 4.2.4.

### **3.9 Data Reliability**

Reliability is the amount of dependability with which an apparatus measures the quality it is designed to measure. Reliability refers to whether you obtain the same answer by using an apparatus to measure something more than once. It should give you the same answer every time you perform such an activity (Bernard, 2011). The reliability of questionnaire material is difficult to assess objectively, even though the respondents are knowledgeable and highly reliable. A questionnaire is reliable to the extent that it measures consistency from one time to another and from one situation to another. Data collected through research questionnaires which were filled in by the respondents in the sample, elicited the information.

The departments have a duty of care to report all environmental incidents and to determine environmental liability. Thus, the incidents are logged into the SAP EH&S Incident Management system to manage an incident's life-cycle. For this reason, the data used for this research is the same as those logged onto the Incident Management System and Reviews.

### **3.10 Ethics Clearance of this research**

The consent letters were signed by the researcher and sent to the respondents who were guaranteed utmost confidence in that their names would not be published. The sampled population is focussed explicitly on the job designation of the target population at the time of the research in order to acquire the information related to the topic under investigation. The gender and the age of the sampled population was not a target for this research.

The ethical clearance letters were obtained from the Company used for this research as well as the ethical clearance letters from the Cape Peninsula University of Technology in order to ensure that the research was undertaken in agreement with the parties involved. The consent letter, ethical clearance letters and a declaration for language editing are attached as Addenda 1, 7, 8 and 9.

### **2.4. Summary**

In this chapter, the research design and methodology used was explained in order to provide an understanding of the research approach. Both qualitative and quantitative methods were used and collected data was analysis and presented in different forms such as; graphs and tables. The samples of the population, significance of the research, data reliability and delineation of the research have been explained. Additionally, the ethics clearance and research consent to participate in the research were requested and approval obtained. This ensure reliability and validity of the findings which will be presented in the next chapter. Thus, the next chapter present the research findings or results and discussion

## **CHAPTER FOUR (4): DATA PRESENTATION, RESULTS, ANALYSIS AND DISCUSSION**

## **CHAPTER FOUR (4): Data presentation, Results analysis and discussion**

### **4. 1. Introduction**

The purpose of the study was to perform an analysis of environmental obligations and liabilities of a distribution division to improve ecologically sustainable development. This chapter presents the results, analysis and discussions which were drawn from the research findings based on; the SAP Environmental, Health and Safety (EH&S) Incident Management System, environmental claims data collected from the Public Claims Committee, from questionnaires distributed to the respondents as well as from site visits conducted at the Company's electricity distribution division. The results and findings of the study are presented in tables and graphs with their corresponding interpretations.

The aim of this chapter is to determine the participants' responses in relation to the statements posed in the fulfilment of the research objectives and answer questions about the understanding of the Company's environmental obligations and liabilities to improve ecologically sustainable development.

### **4. 2. Results and Findings**

It is pivotal for the Company to understand its environmental obligations to fulfil its duty of care. Where environmental obligations are not fulfilled, it is of utmost importance to understand that the Company should face the consequences of an environmental liability and therefore remediate the environmental degradation.

According to South African legislation, the Company should safeguard the environment through adhering to its environmental obligations and accountabilities to improve ecologically sustainable development. This chapter illustrates the subsequent findings and discussions. The work is structured in the followings sub-sections as indicated below:

#### **4. 2. 1. SAP Environmental Incident Management System**

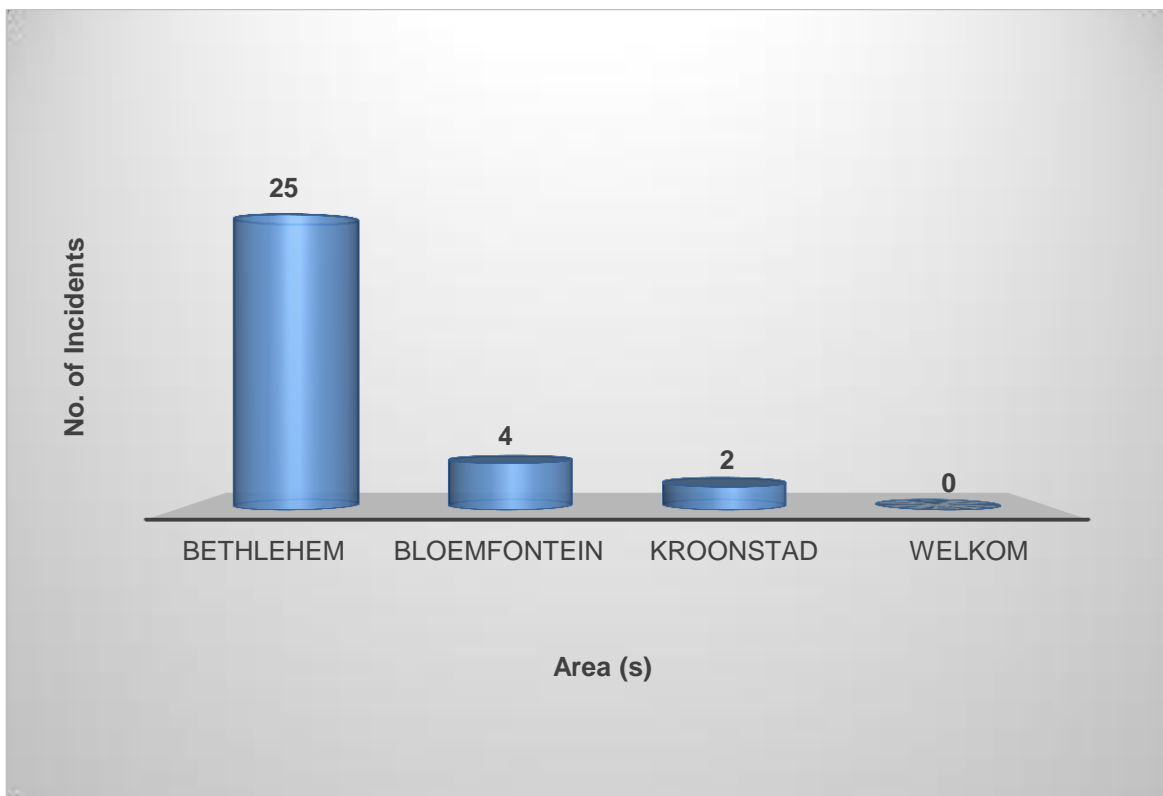
This section illustrates environmental incidents that were reported in the Company and that were logged into the SAP EH&S Incident Management System to ensure traceability, performance and the implementation of recommendations. This research, focused on environmental incidents such as veld fires, oil spillages, bird mortality, tree cutting and animal electrocution which require environmental obligations

##### **4. 2. 1. 1. Veld fire incidents**

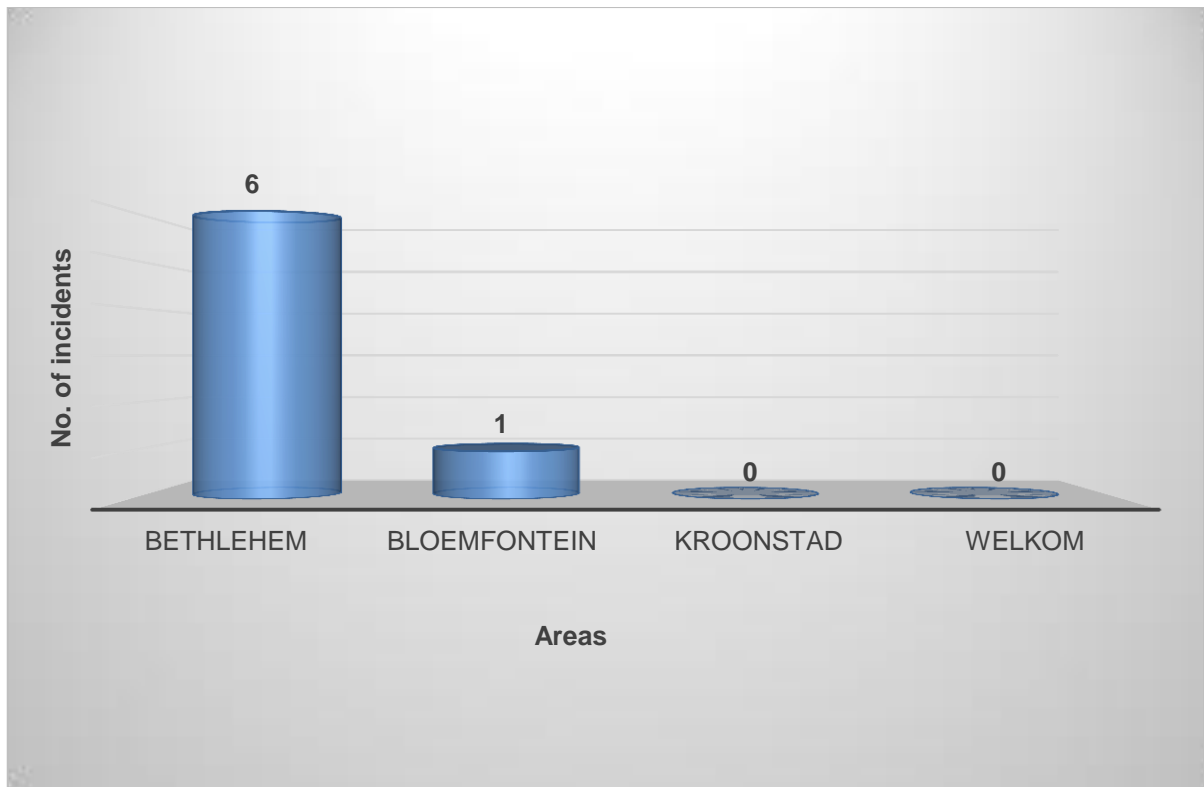
Figures 4.1, 4.2, 4.3 and 4.4 below illustrate veld fire incidents which were reported from January 2014 to August 2017 for the four sectors which include the Company's area of operation and maintenance. As illustrated below, Bethlehem recorded 25 veld fire incidents, four for Bloemfontein, while Kroonstad recorded two and Welkom had no recorded veld fire incidents.

These veld fire incidents were as a result of, among other things, the clashing of conductors causing a flashover, wild animals climbing onto the transformers or electrical equipment at substations causing flashover. There was also a tree which was felled and unfortunately fell onto the conductor, causing the conductors to clash and a fire started. These incidents pose an environmental obligation on the Company to insulate or cover their electrical equipment so that the flashover does not occur when conductors clash.

According to the Constitution of South Africa (1998b) Chapter 4, there is an environmental obligation for owners to prepare and maintain a fire break which should be wide and long enough to prevent a veld fire from spreading to or from neighbouring land.



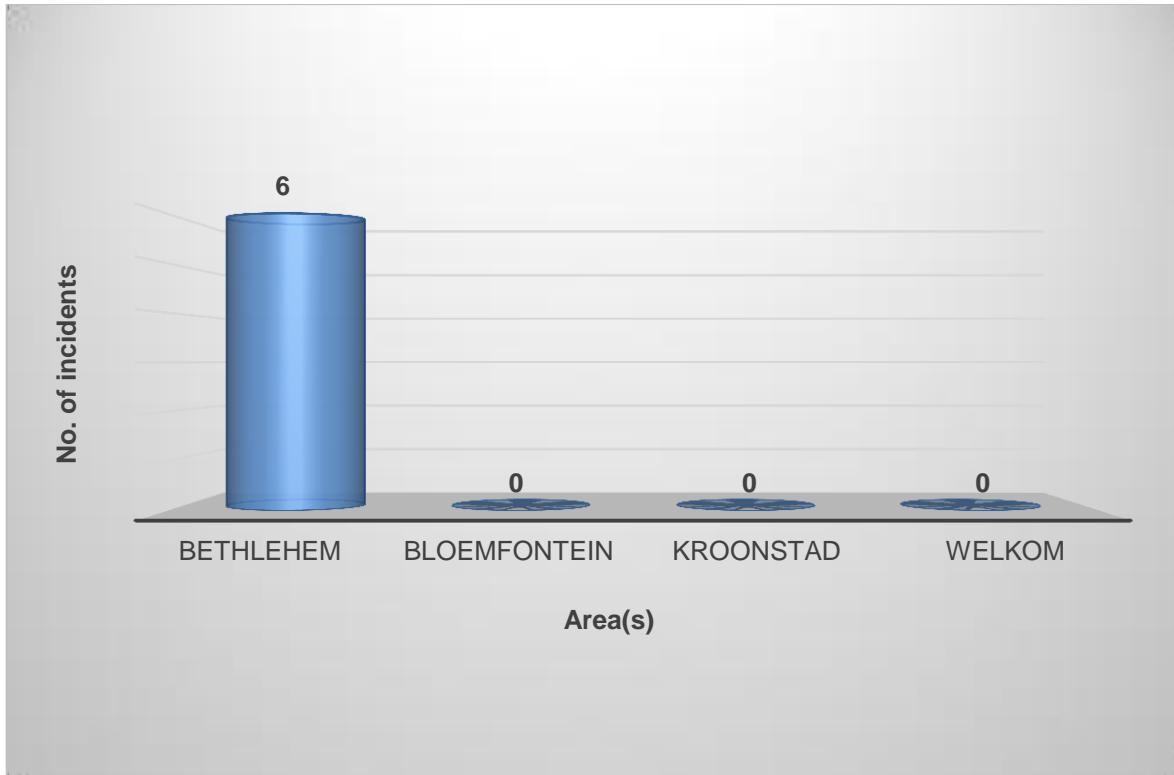
**Figure 4. 1: Veld fire incidents for the year 2014**



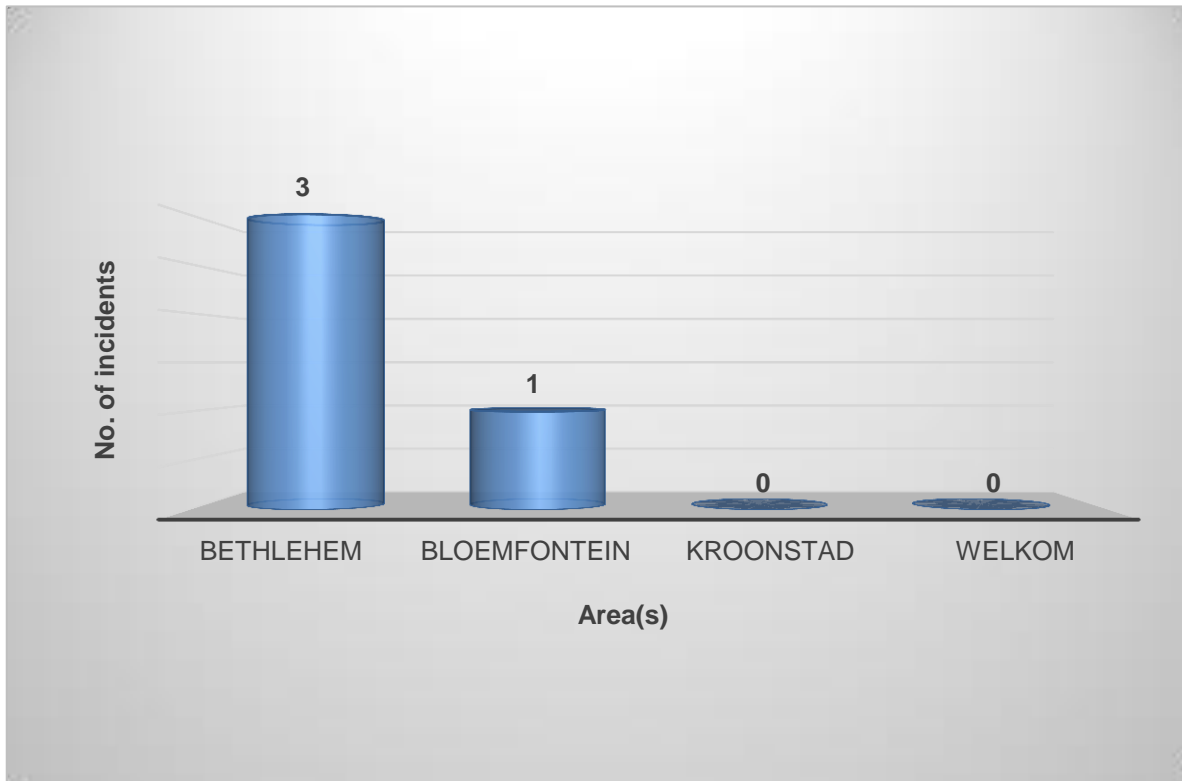
**Figure 4. 2: Veld fire incidents for the Year 2015**

As reflected in Figures 4.1 and 4.2 above for the years 2014 and 2015, the Bethlehem area recorded a large number of veld fire incidents. These veld fire incidents were due to several factors such as animals causing flashover when they climbed onto the electricity structures, conductor clashes, twisted cross arms, broken poles.

Figures 4.3 and 4.4 below illustrate that Kroonstad and Welkom continued to have zero reported veld fire incidents for both the sample period of 2016 and 2017, while Bloemfontein recorded zero veld fires in the year 2016 and only one incident in the year 2017.



**Figure 4. 3: Veld fire incidents for the Year 2016**



**Figure 4. 4: Veld fire incidents for the Year 2017**

Additionally, Figures 4.1 to 4.4, illustrate that veld fire incidents remain high in the Bethlehem area when compared to Bloemfontein, Kroonstad and the Welkom area. The results have shown that



Bethlehem has an issue regarding veld fires in the sector. Thus, it is the Bethlehem sector's environmental obligation to ensure that all their obligations are understood and met to minimise environmental liabilities and improve ecologically sustainable development.

#### 4. 2. 1. 2. Oil Spillage incidents

The pie chart figures below illustrate oil spills that occurred during the Company's operations and maintenance. It is a legal environmental requirement that obliges every person who causes, has caused or may cause significant pollution of the environment to take reasonable measures to prevent, minimise or rectify pollution causing harm and degradation to the environment from occurring or continuing to occur (Paschke and Glazewski, 2006; Van der Linder, 2006).

Care must be taken to protect the environment while conducting the business of promoting social and economic development. For this reason, the Company must ensure that the remediation of environmental damage is carried out to improve ecologically sustainable development.

Figure 4.5 below is a pie chart which illustrates the proportion of oil spillage occurring at the four different areas namely; Bloemfontein, Bethlehem, Kroonstad and Welkom as indicated in the legend. Seventy five percent of the all oil spillage incidents that occurred during 2014 occurred in the Welkom area. The remaining 25% is shared among Bethlehem, Bloemfontein and Kroonstad, with Kroonstad reporting 13% of oil spillage and both Bloemfontein and Bethlehem reporting 6% each for the 2014 period. These oil spillage incidents occur because of several reasons such as mechanical failure, lightning strikes and vandalism.

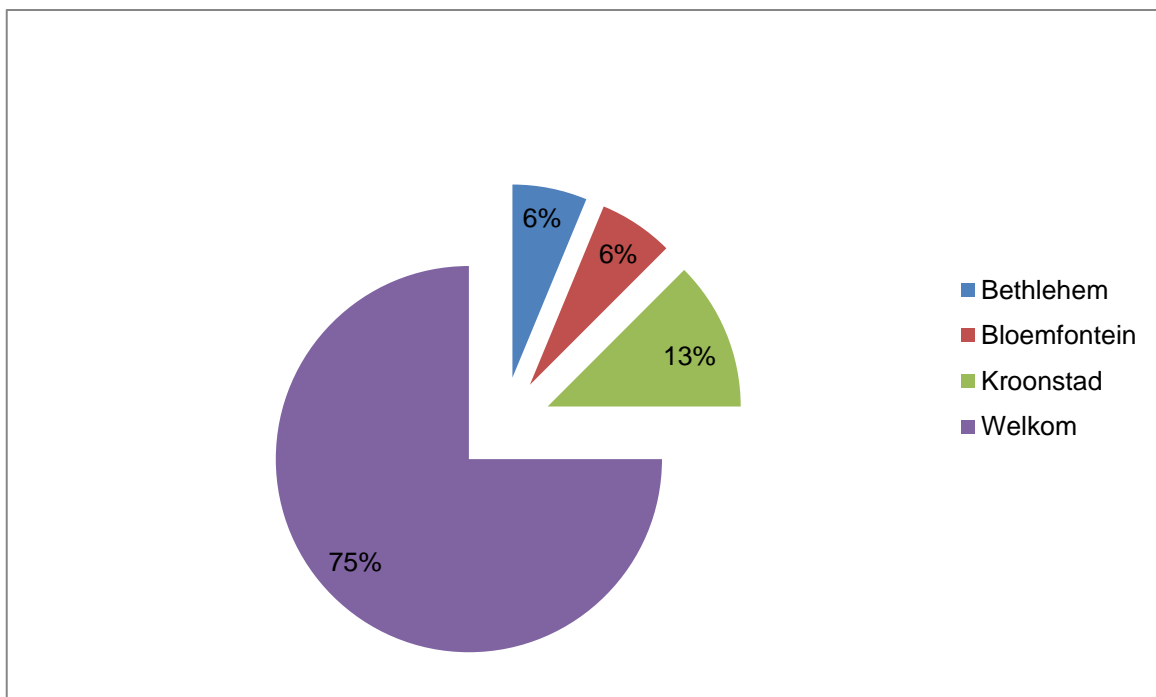
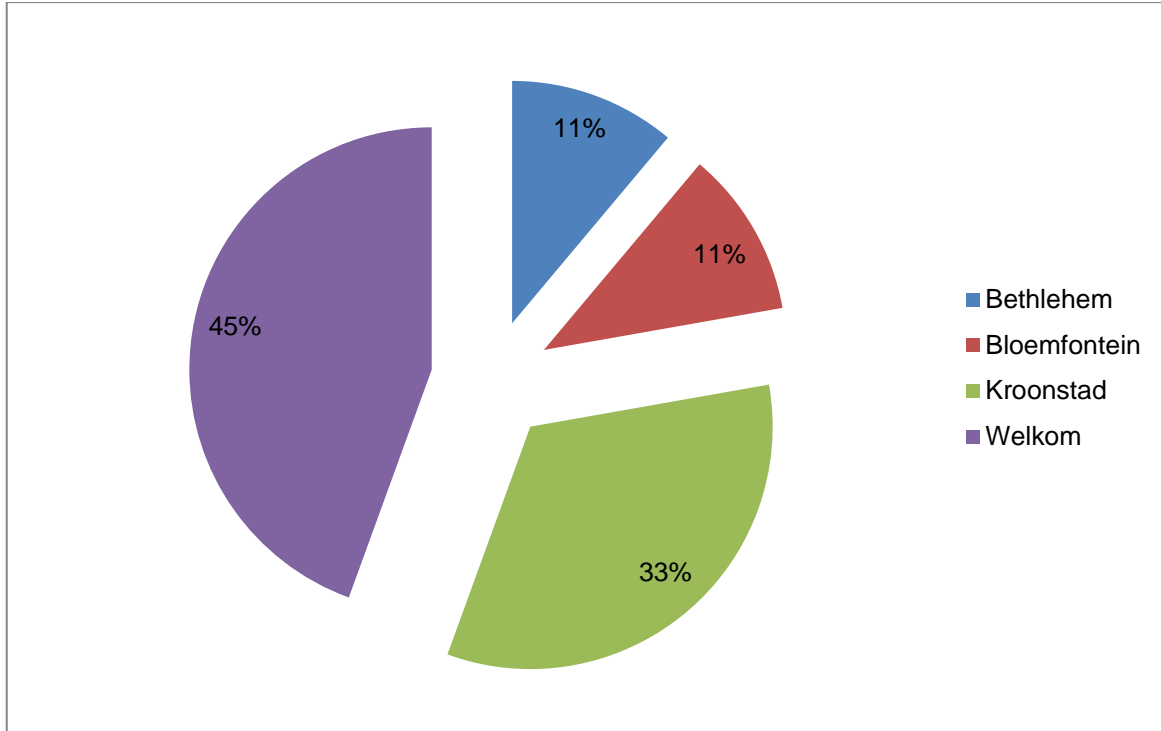


Figure 4. 5: Oil Spill incidents for the Year 2014

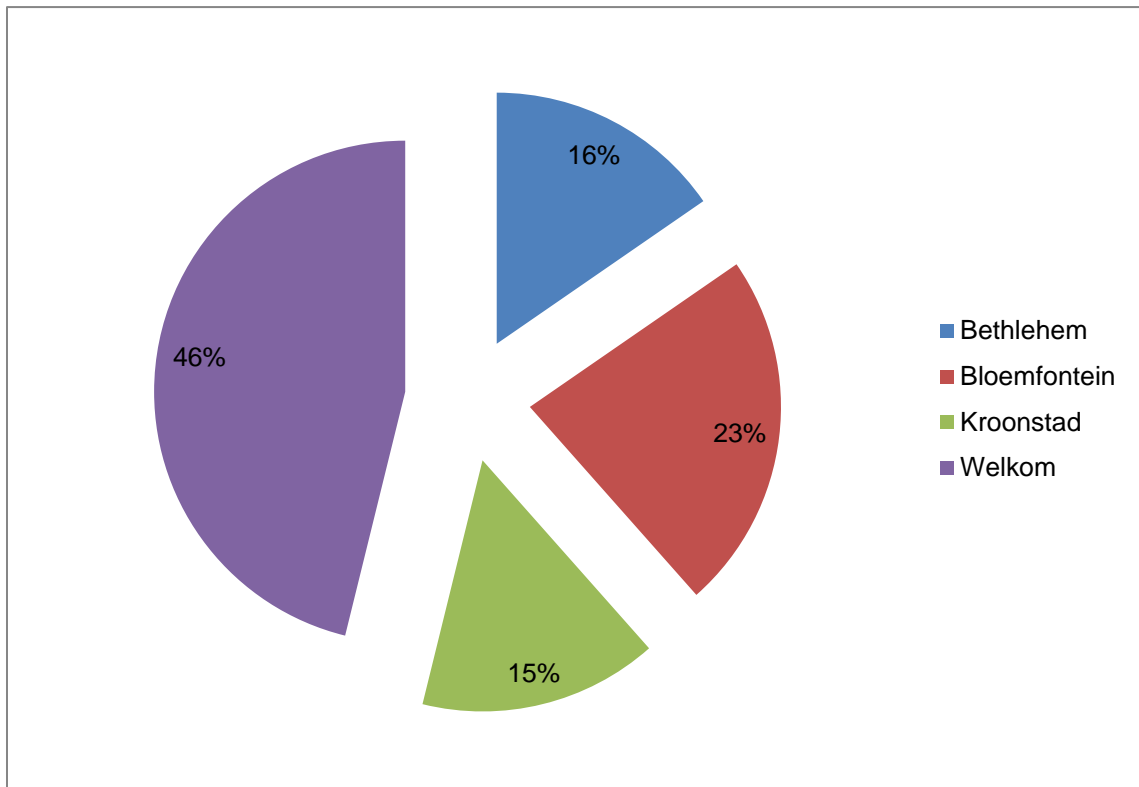
Whereas, Figure 4.6 below shows the representation of oil spillage incidents that occurred during 2015. During this period, the Welkom area recorded the highest percentage of incidents (45%) followed by Kroonstad (33%), while Bethlehem and Bloemfontein showed an equal percentage of reported oil spill incidents of 11% each.



**Figure 4. 6: Oil Spill incidents for the Year 2015**

In 2016, oil spillage incidents, illustrated in Figure 4.7 below, have few similarities with those encountered during 2014 in Figure 4.5. However, the percentage of oil spillage incidents in the Welkom area decreased to 45%, while it increased in the three remaining areas to 33% in Kroonstad and 11% in both Bethlehem and Bloemfontein.

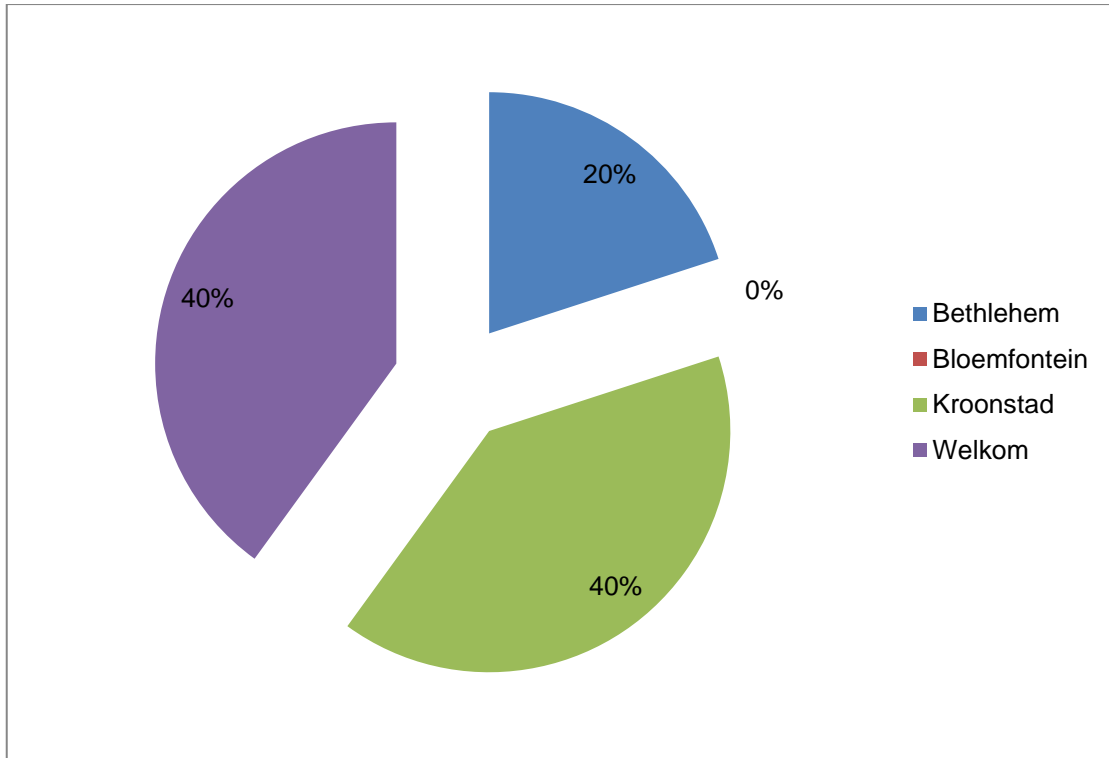
As displayed in Figure 4.7, the Bloemfontein area recorded 23% of the oil spill incidents. This has shown an increase in incidents from 6% in 2014, 11% in 2015 to 23% recorded in 2016, when comparing oil spillage incidents. The Welkom area still dominated with 46% of the total number of oil spill incidents recorded, compared to 23% for Bloemfontein, 16% for Bethlehem and 15% for Kroonstad.



**Figure 4. 7: Oil Spill incidents for the Year 2016**

Figure 4.8 below illustrates a slightly different pattern as the Bloemfontein area does not appear in the figure, which simply indicates that the Bloemfontein area did not have a recordable incident for the 2017 study period. Welkom and Kroonstad areas were the highest, equalling 40% of the recorded oil spillage incidents for the study period. The Bethlehem area has recorded 20% of the oil spillage incidents.

The Welkom area has proven to be an area that is prone to oil spill incidents and that raises the question of what is being done in the area in relation to environmental obligations and liabilities associated with such oil spillage incidents.

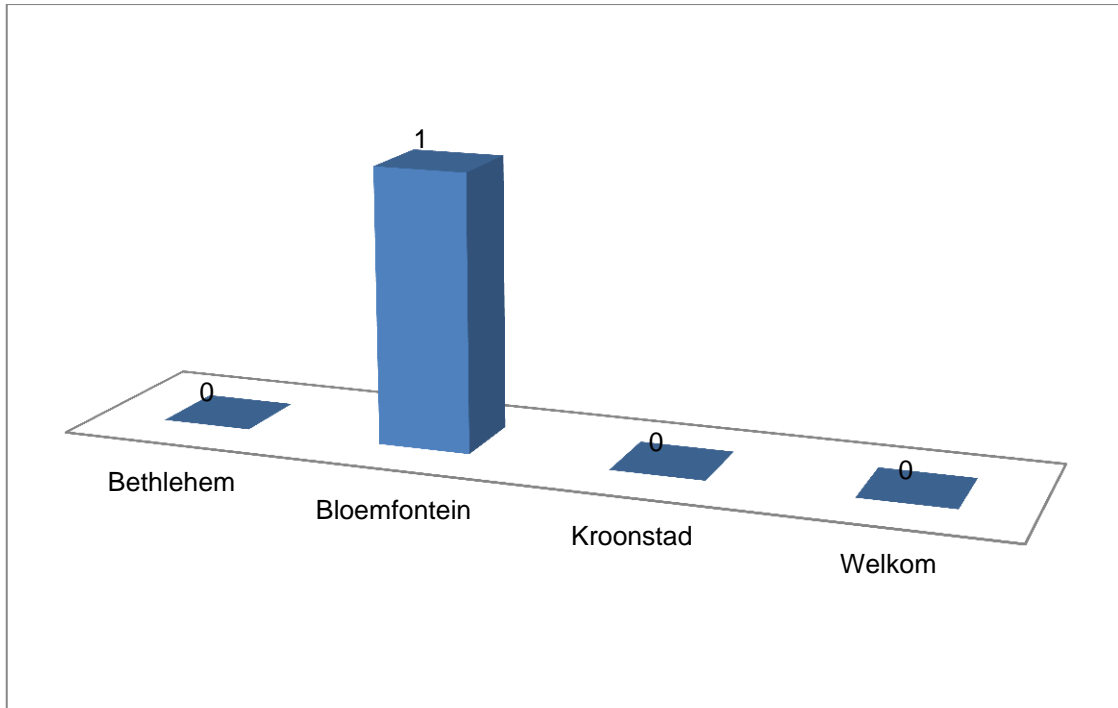


**Figure 4. 8: Oil Spill incidents for the Year 2017**

With regard to all oil spillage incidents illustrated above in Figures 4.5 to 4.8, Welkom area have recorded highest oil spillage incidents than any other area. It may be concluded that the area is of great concern with oil spillage incidents. Bloemfontein area have not recorded oil spillage incident as illustrated in figure 4.8. The oil spillage incidents were the results of equipment or bushing technical failures, vandalism of transformer and transformers which caught fire. Thus, the environmental obligations and liabilities differ and the negative impacts to improve ecologically sustainable development vary among the areas.

#### **4. 2. 1. 3. Bird Mortality Incidents**

Figures 4.9 to 4.12 illustrate the bird mortality incidents recorded from the 01 January 2014 to 31 August 2017, which covers the research period. Bird mortality incidents occur because of, among other things, birds colliding with the powerlines or electrocution. The 2014 incidents record shows that Bloemfontein is the only area that had any bird mortality. Bethlehem, Kroonstad and Welkom did not record any bird mortality incidents in the SAP EH&S Incident Management software.

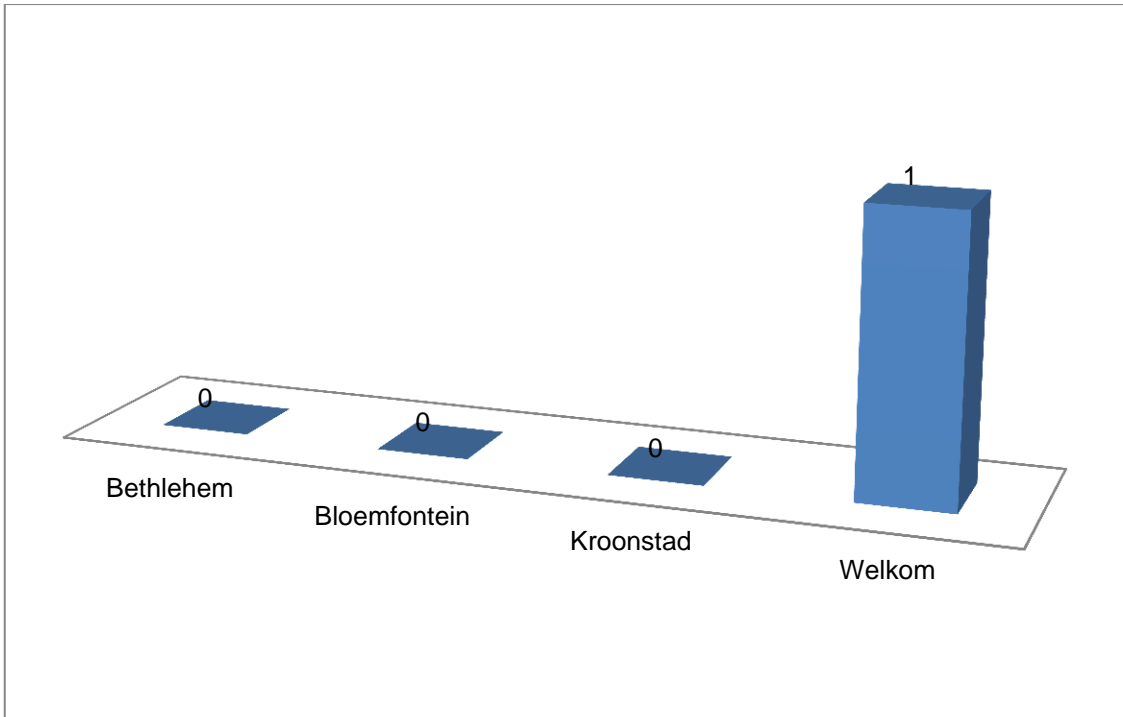


**Figure 4. 9: Bird Mortality incidents for the Year 2014**

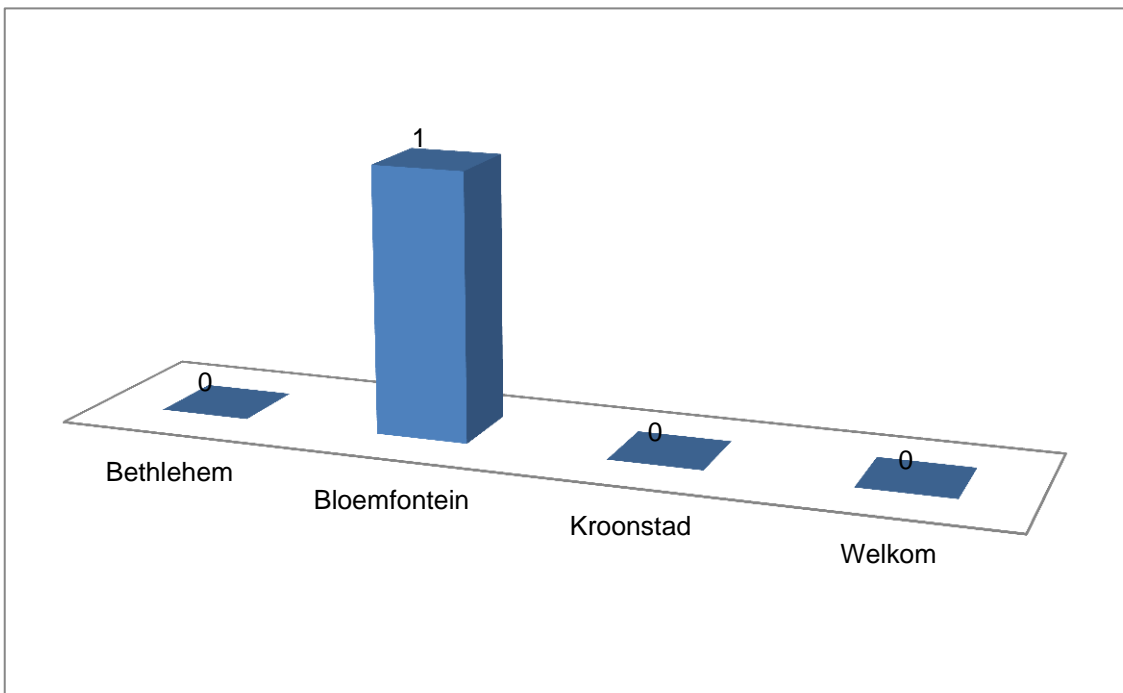
Figure 4.10 below presents incidents in 2015 in which Welkom is the only area to have one reported and retrievable incident recorded for bird mortality. Bethlehem, Bloemfontein and Kroonstad area recorded zero bird mortality incidents.

Additionally, Figure 4.11 below illustrates that Bloemfontein is the only area to have had bird mortalities in 2016. Bethlehem, Bloemfontein and Kroonstad areas recorded zero bird mortality incidents. This finding validates the findings of incidents of bird mortality recorded for 2014, where Bloemfontein is the only area to have recorded a bird mortality incident.

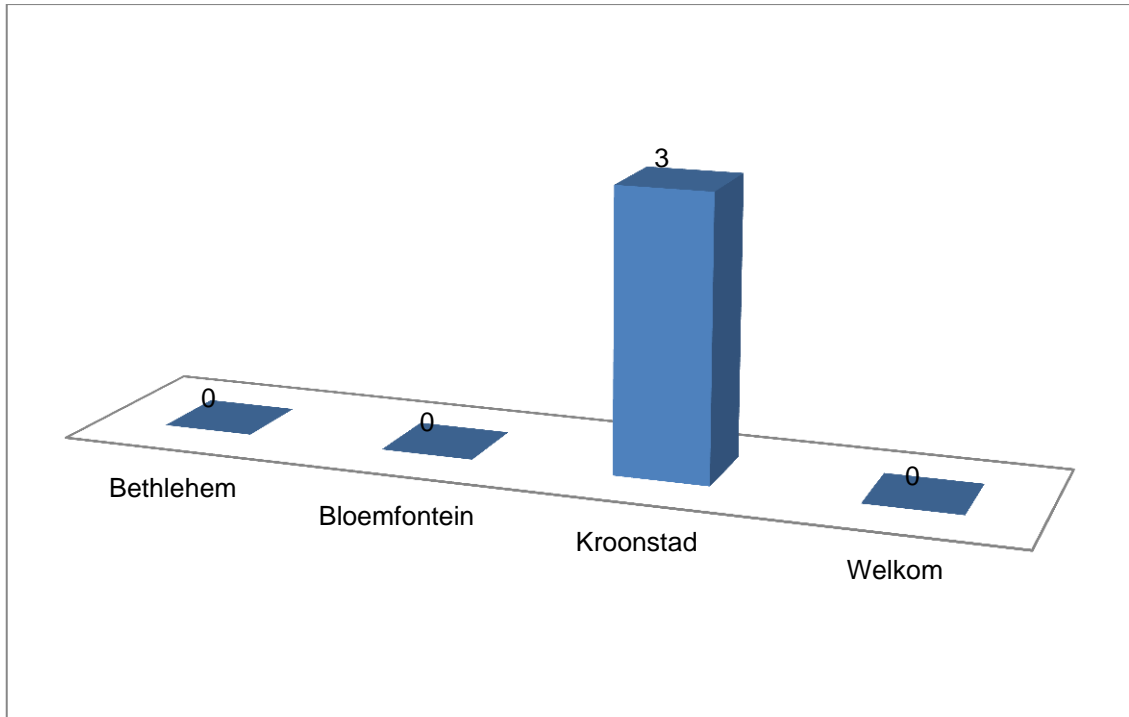
However, Figure 4.12, which represents bird mortality incidents for January-August 2017, indicates that the Kroonstad area is the only area to have data for bird mortality incidents.



**Figure 4. 10: Bird Mortality incidents for the Year 2015**



**Figure 4. 11: Bird Mortality incidents for the Year 2016**



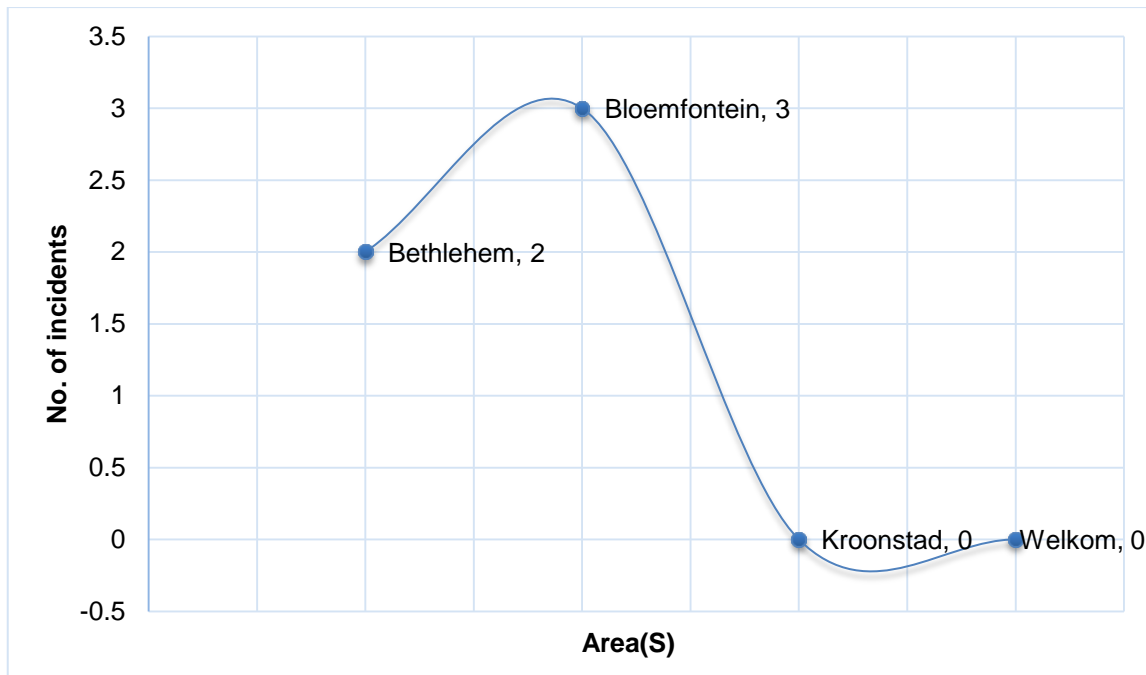
**Figure 4. 12: Bird Mortality incidents for the Year 2017**

#### **4. 2. 1. 4. Animal electrocution incidents.**

The incidents related to animal electrocution were also recorded as they pose an environmental obligation and liability to the Company. The animal electrocution incidents occur because of, among other things, animals rubbing themselves up against the wooden powerlines, a storm in the area or a veld fire burning the powerline. These kinds of phenomena result in the loosening of powerlines as well as the breaking of wooden poles which lead to animals to come into contact with the live wires and get electrocuted.

The definition of the term 'environment' includes, animals but does not differentiate between domestic animals or wild animals. For this reason, the researcher has collected and analysed data on animal electrocutions that were recorded by the Company.

Figure 4.13 illustrates that both Kroonstad and Welkom had zero (0) animal electrocution incidents recorded for 2014. Bethlehem recorded two (2) animal electrocution incidents, while Bloemfontein recorded three (3) incidents. This shows that Bloemfontein had more incidents compared with the other areas.



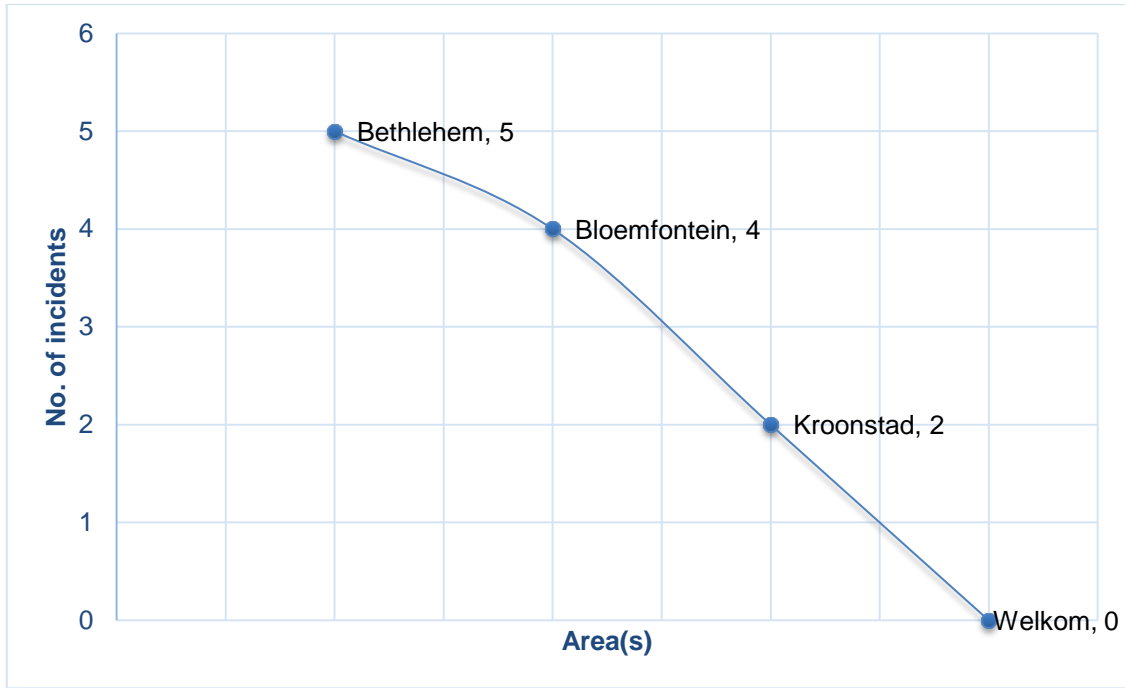
**Figure 4. 13: Animal electrocution incidents for the Year 2014**

Figure 4.14 presents the animal electrocution incidents for 2015. An analysis of the graph illustrates that the Bethlehem area dominated with three (3) animal electrocutions, while Bloemfontein came second with two (2) incidents and the Welkom and Kroonstad area remained far behind with zero (0) incidents reported, respectively.

Figure 4.14 illustrates that both the Bethlehem and Bloemfontein areas are more likely to have more environmental liabilities in relation to animal electrocution compared with the Welkom and Kroonstad areas. These environmental liabilities compromise the ideal ecologically sustainable development as the death of these animals, which are part of the environment, could lead to financial liability. It could also lead to a public outcry from nature conservation organisations, interested parties and government.

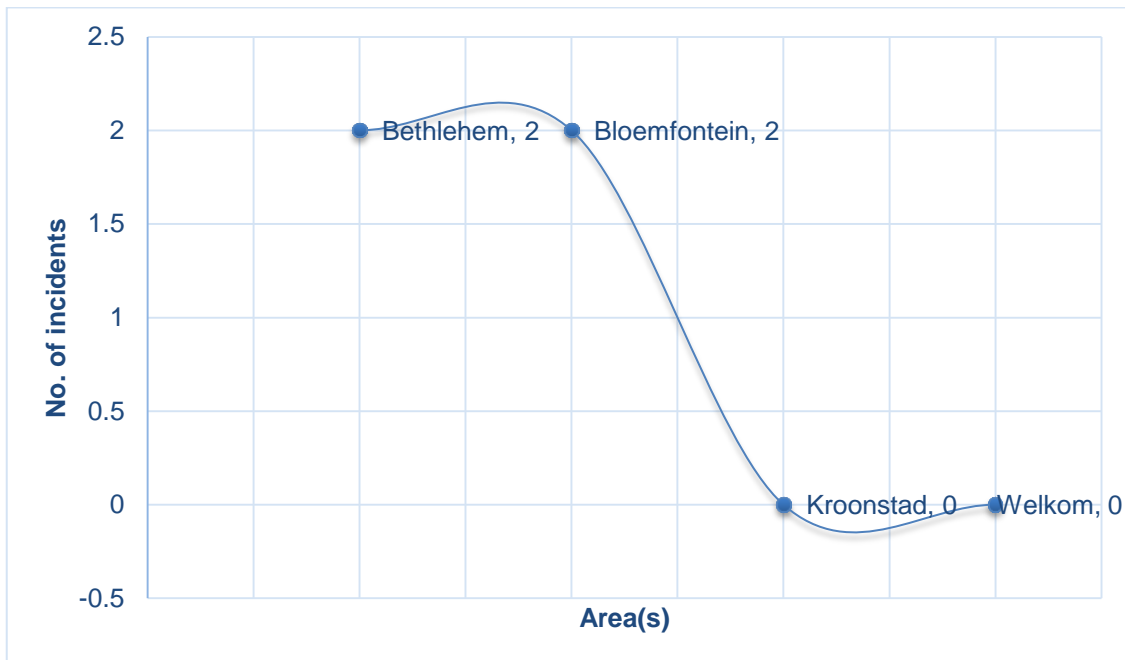
For this reason, the Company is required to examine the root cause of the incidents which might be, amongst others, the veld fire incidents in the area which might burn the poles resulting in poles falling during windy weather, causing wooden poles to rot and require maintenance.





**Figure 4. 14: Animal electrocution incidents for the Year 2015**

Figure 4.15 below presents animal electrocution incidents that occurred during 2016. An observation of the recorded incidents shows that both the Bethlehem and Bloemfontein areas had two (2) reported animal electrocution incidents for 2016, while the Kroonstad and Welkom areas both reported zero (0) electrocution incidents.



**Figure 4. 15: Animal electrocution incidents for the Year 2016**

When comparing animal electrocution incidents, as illustrated in Figures 4.13, 4.14 and 4.15, Welkom recorded zero (0) animal electrocution incidents. Both Bloemfontein and Bethlehem

recorded animal electrocution incidents in all three years. For this reason, the data showed that the Welkom area had no environmental obligation and associated liability related to animal electrocution incidents. The Bloemfontein and Bethlehem areas have more environmental obligations and liabilities in relation to animal electrocutions.

The Kroonstad area recorded zero (0) incidents in Figure 4.13 and 4.15 and only recorded one incident in Figure 4.14. This illustrates that the Kroonstad area had fewer environmental obligations to protect the environment or prevent animal electrocutions but more environmental obligations than that of the Welkom area.

There were no animal electrocution incidents recorded during the study period in 2017. For this reason, the figure for 2017 animal electrocution incidents is not presented as it was not going to present any detail.

#### **4. 2. 2. Environmental Obligations**

The respondents responded to all the statements provided in the questionnaires that were distributed to them, which were intended to achieve the research objectives and answer research questions where respondents had to indicate their perceptions or extent of agreement with the statement.

There were nine statements related to environmental obligations. Figure 4.16 below illustrates the responses to statements that are related to environmental obligations and should be read in conjunction with Addenda 3. Environmental obligations require any person who operates in the environment and, whether accidental or by other occurrences, to be obliged to prevent, notify and manage environmental degradation (Winter *et al.*, 2008; Fuggle and Rabie, 2009; Nel and Kotzé, 2009).

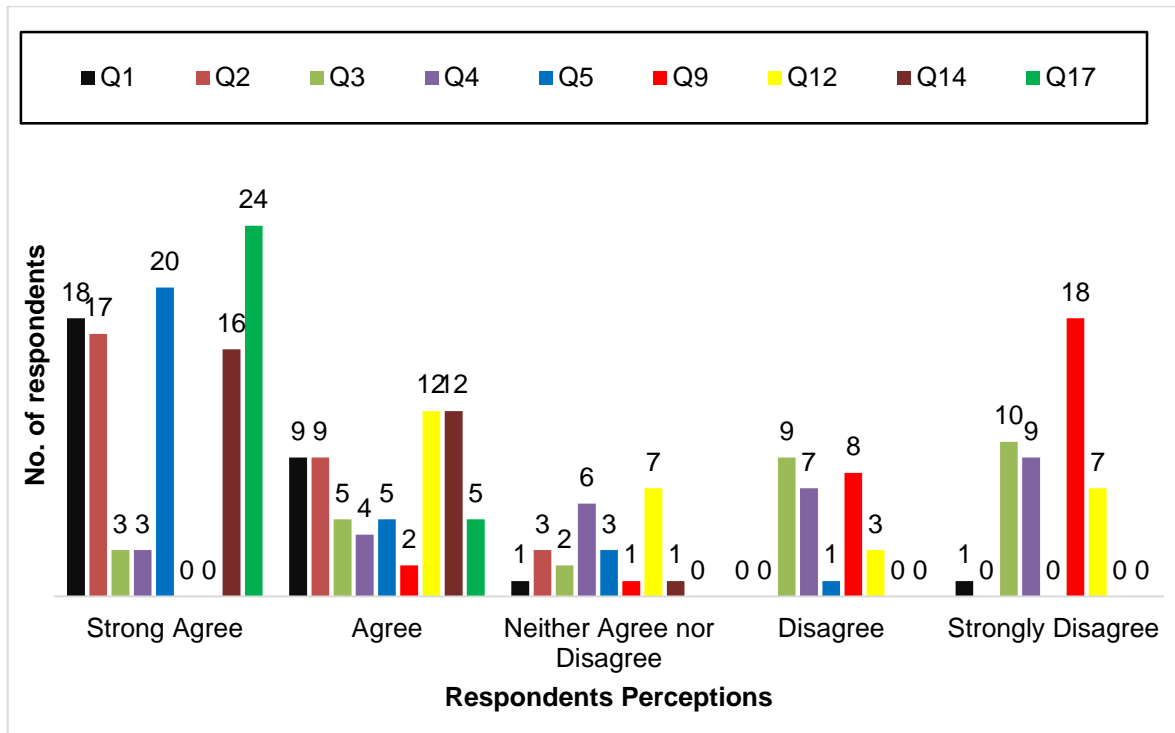
Statement 17 in Figure 4.16 below illustrates an environmental training-related question, illustrating that most respondents strongly agreed that environmental training is required to provide environmental awareness to everyone in the company. These results give a clear indication that environmental obligations will only be achieved when employees have received training and when they are aware of their environmental duty of care.

Statement 5 deals with the reporting of all environmental incidents irrespective of who caused the incident and the extent of the impact on the environment. Thus, this statement scored the second highest consensus (strongly agree) among the respondents.

Statement 9 dealt with the statement of whether there was a need to inform landowners about environmental incidents that had occurred on their land. Most respondents, as illustrated in Figure 4.16 below, strongly disagreed with the statement that there was no need to inform landowners about environmental incidents that occurred on their land. Therefore, the researcher believes the

respondents understand their environmental obligation to inform landowners (interested and affected parties) about the incidents that occur on their properties.

It must be noted that there are those respondents who neither agree nor disagree with reporting environmental incidents to be captured on the SAP EH&S Incident Management System. This means that they are employees who are not certain about what the correct thing to do is. Therefore, even though environmental obligations seem to be understood by some respondents, there are some respondents who do not understand environmental obligations.



**Figure 4. 16: Environmental Obligation Statement Response**

**4. 2. 3. Environmental Liability**

There were four statements which were related to environmental liabilities to achieve the research objectives and answer research questions where respondents had to indicate their perceptions or extent of agreement to the statement. According to Winter et al. (2008), ‘Environmental liability is not dependent on whether the environmental good belongs to someone’s property’. Thus, the land may be a private land or owned by a certain individual and if that individual is unable to institute liability claims, the interested or affected party may act on behalf of the environment and use its environmental legislative framework and the court to enforce the polluter to compensate, remediate or both.

Figure 4.17 illustrates the responses to the statements that are related to environmental liability to achieve the objectives of the study and respond to research questions. The statements are

referred to as Statement (Q) with the number next to the letter Q, which indicates the statement number as per the questionnaire completed by the respondents.

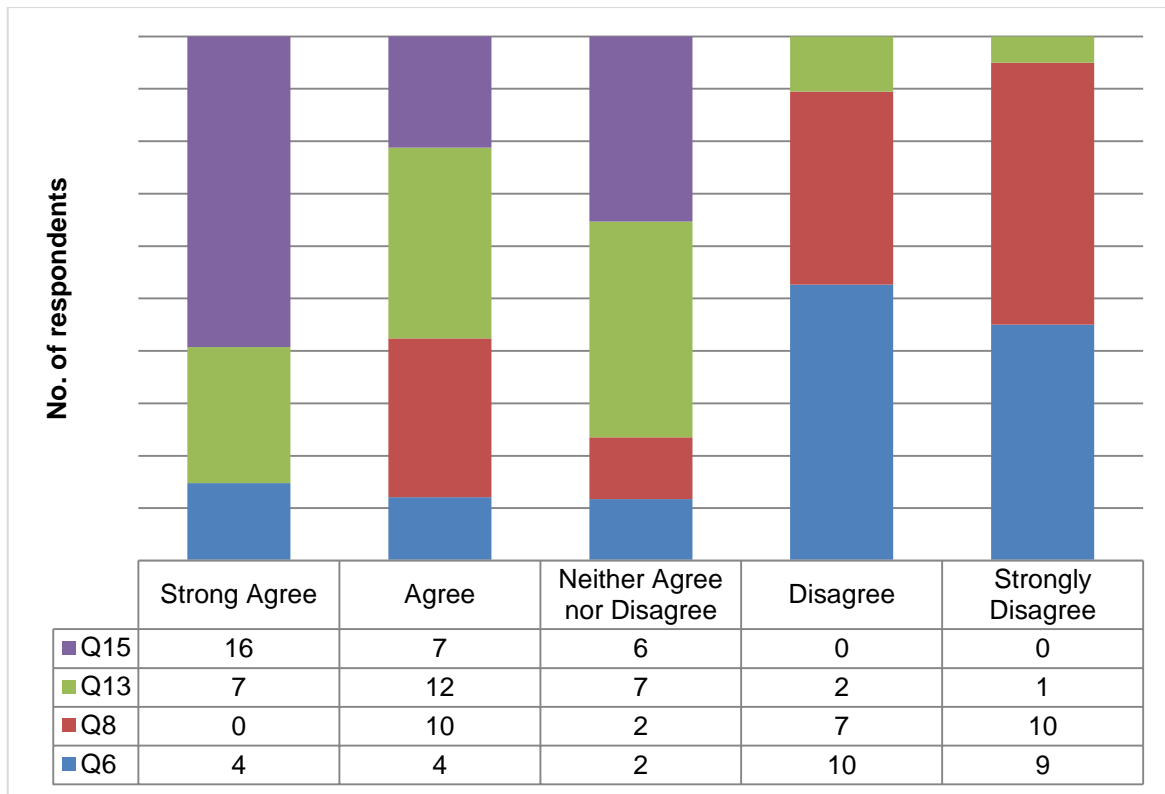
As presented in Figure 4.17 below, Q15 indicates that most respondents strongly agree with a statement that environmental liability means that one can be fined, compensated or be responsible for cleaning up if pollution was caused while performing his/her duties. Q6 indicates that most respondents disagreed with the statement that, when working on behalf of the Company and environmental pollution occurred due to the processes followed, that person could not be held responsible for the pollution caused and be held liable.

This indicates that the respondents are aware that when performing a task on behalf of the employer, the employee should be obliged to ensure and avoid negative effects on the environment. When negative effects occurred in the environment, the person who was responsible for that work was liable for compensation or remediation of the effects caused to the environment.

The results and findings presented above correspond with personal liability provisions made by South Africa (1998a) which explains that whenever any person does or omits to do a task that has been his or her task on behalf of the employer that would be an offence in terms of South Africa (1998a). That person should be liable in respect thereof as if he or she were the employer. For this reason, the respondents understand that the environmental liability is influenced by prescribed environmental obligations and influences the ideal goal to achieve ecologically sustainable development.

The respondents indicated, as illustrated by Q8, that most respondents strongly disagreed with the statement that the Company could not be found liable and punishable for disregarding the country's environmental legislation when they complied with its policies. Therefore, the Company had to operate and fully comply with the environmental legislation of the Republic of South Africa as the Company operates within the jurisdiction of the Republic.

Most respondents agreed to that the Company spent a great deal of money to clean up as well as on the compensation of environmental incidents due to the nature of the business as indicated by Q13 in Figure 4.17. This indicates that the environmental liability issues are known and require intervention.



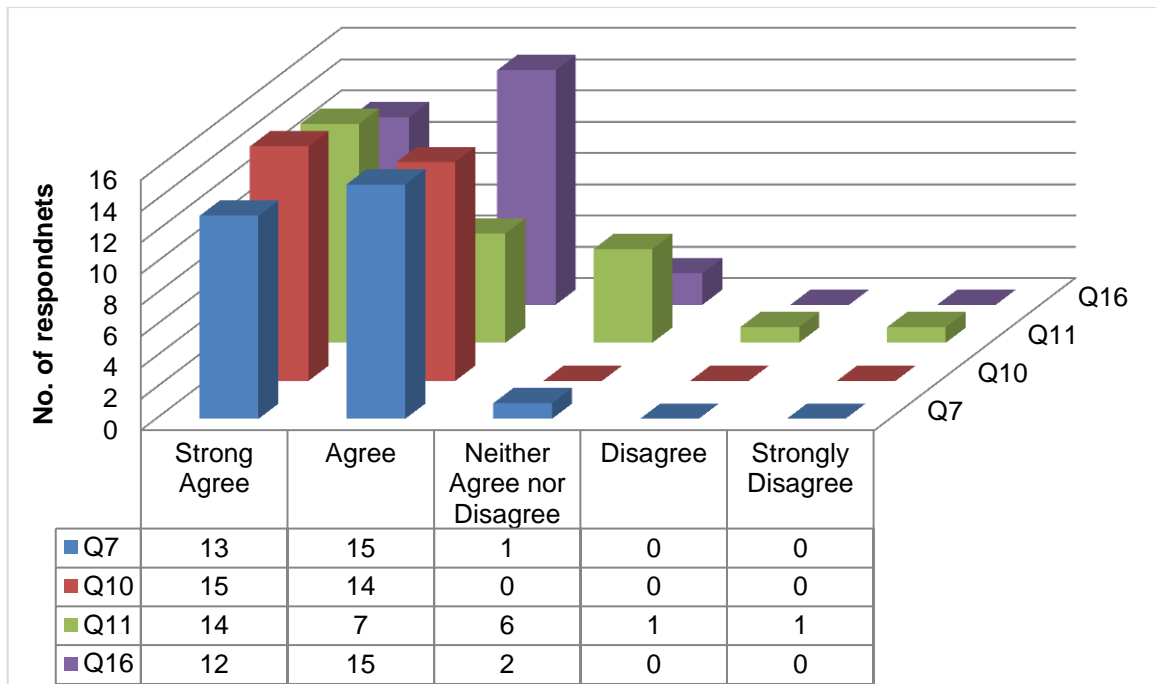
**Figure 4. 17: Environmental Liability Statement Response**

#### **4. 2. 4. Ecologically sustainable development**

There were four statements related to ecologically sustainable development which attempted to achieve the research objectives and answer research questions where respondents had to indicate their perceptions or extent of agreement to the statements. Environmental damage does not only look at what impacted negatively on the other person's property, but also determines the impact on the environment (Richter *et al.*, 2003; Winter *et al.*, 2008). Thus, improving ecologically sustainable development is aimed at protecting environmental damage through adhering to what is acceptable by prescribed legislation.

Figure 4.18 below illustrates that many of the respondents either strongly agreed with almost all the statements provided. Both Q7 and Q16 illustrated that the respondents agreed that Environmental Management Systems were the best tools to attain ecologically sustainable development and that ecologically sustainable development meant protecting the environment while promoting economic and social development.

The highest number of respondents was recorded, as indicated by Q10, that they were of the view that ecologically sustainable development was achieved through the preservation of ecological integrity.



**Figure 4. 18: Ecologically Sustainable Development Statement Response**

The results and findings presented above provide a better understanding of ecologically sustainable development and what needs to be done to achieve it. Ecologically sustainable development comprises the internalisation of environmental costs into decision-making for economic and other development strategies, programmes and projects which have the potential to impact on the environment (Preston, 2006).

#### 4. 2. 5. Site Visits

Figure 4.19 below shows an oil spillage at one of the Bethlehem sites. The picture was taken by the researcher during a site visit Bethlehem where oil-containing equipment is stored upon removal from the site as a result of explosion, technical or mechanical faults, lightning strikes and vandalism.

The transformers, breakers and other oil-containing equipment were placed on the cement floor to prevent oil from spilling on the ground. Upon arrival at the site, it was noticed that the oil was leaking, and the cement floor could not contain the leaking oil as the floor did not have an oil catchment area to store oil.

The Company is therefore required to take reasonable measures to prevent the pollution and where pollution could not be prevented, to minimise and remediate the effect of pollution or environmental degradation (Rabie, Blignaut & Fatti, 1994; Fuggle & Rabie, 2009). This poses an environmental obligation on the Company to take reasonable measures to prevent or rehabilitate the effects of pollution. For this reason, the Company is also liable for the cleaning up of the pollution.

All environmental incidents must be reported for the record as well as the tracking of the incident to ensure full implementation of corrective recommendations. The incident, illustrated in Figure 4.16 below, was never reported to the Company. The researcher came across the spillage during a site visit on the 04 March 2016 at 11:53.

The Company have appointed and paid a contractor to clean up the oil spillage. The contractor was required to first remove all scrapped electrical equipment that contained oil on site, using a truck with a drip tray to prevent oil spilling during transport. The scrap material was to be disposed of as a mitigation measure to prevent continuing pollution on the environment.



**Figure 4. 19: Oil spill at the storage area**

The Image in Figure 4.20 below was taken on 03 May 2016 at 14:03 and presents an oil spillage incident clean up that was initiated in the Virginia area near Welkom. The incident occurred due to a mechanical failure of a strategic 10 MVA transformer supplying 132/22 kVA after the transformer had caught fire.

The transformer contained 2000 litres of oil which had all spilled on the ground and caused land pollution. The oil spillage incidents triggered an environmental obligation to report and clean up the effects on the land pollution. To adhere to environmental obligation and associated environmental liability, the Company appointed and paid a third party to clean up the oil spillage.



**Figure 4. 20: Contractor cleaning up oil spill**

The image in Figure 4.21 below was taken on 21 July 2016 at 09:48 at Tweespruit in the Bloemfontein area. The image illustrates an oil spillage incident which was caused by the technical failure of a transformer which resulted in an oil spill on the ground. A container was placed underneath the leak to prevent further oil spills on the ground. This figure shows that the person who placed a container underneath the oil dripping area was aware that the oil drip was not allowed, and that environmental pollution had to be prevented.

The site visit was conducted at an area where major oil spillage incidents had been reported to the Company to ensure that the duty of care had been undertaken and effects of pollution on the environment remediated.





**Figure 4. 21: Container used to contain oil spill**

Figure 4.22 below illustrates an oil spillage incident that occurred due to an explosion from an NEC Transformer, causing land pollution inside the substation. The image was taken on 11 August 2017 at 14:55 during a waste review which included a site visit. The Company requires a work stoppage to be able to perform the required maintenance of the NEC Transformer which resulted in power cuts to the customers that receive power from the substation. Van der Linde (2006) explains that anybody who causes, has caused or may cause ecological degradation is environmentally obliged to clean up the effects of such an environmental degradation.



**Figure 4. 22: Land pollution from exploded NEC Transformer**

The site visit conducted has enabled the researcher to discover the environmental incidents that have occur. This resulted in environmental duty of care and associated liabilities by means of paying a third party to clean-up oil spillage. The undertaking of environmental obligations and liability enables to determine how ecologically sustainable development was achieved.

Below, are the findings of the environmental claims the Company experience for the years 2014 and 2015. The year 2016 and 2017 environmental claims and financial liability could not be acquired at the time of the research. Therefore, the researcher relied on the information available at the time.

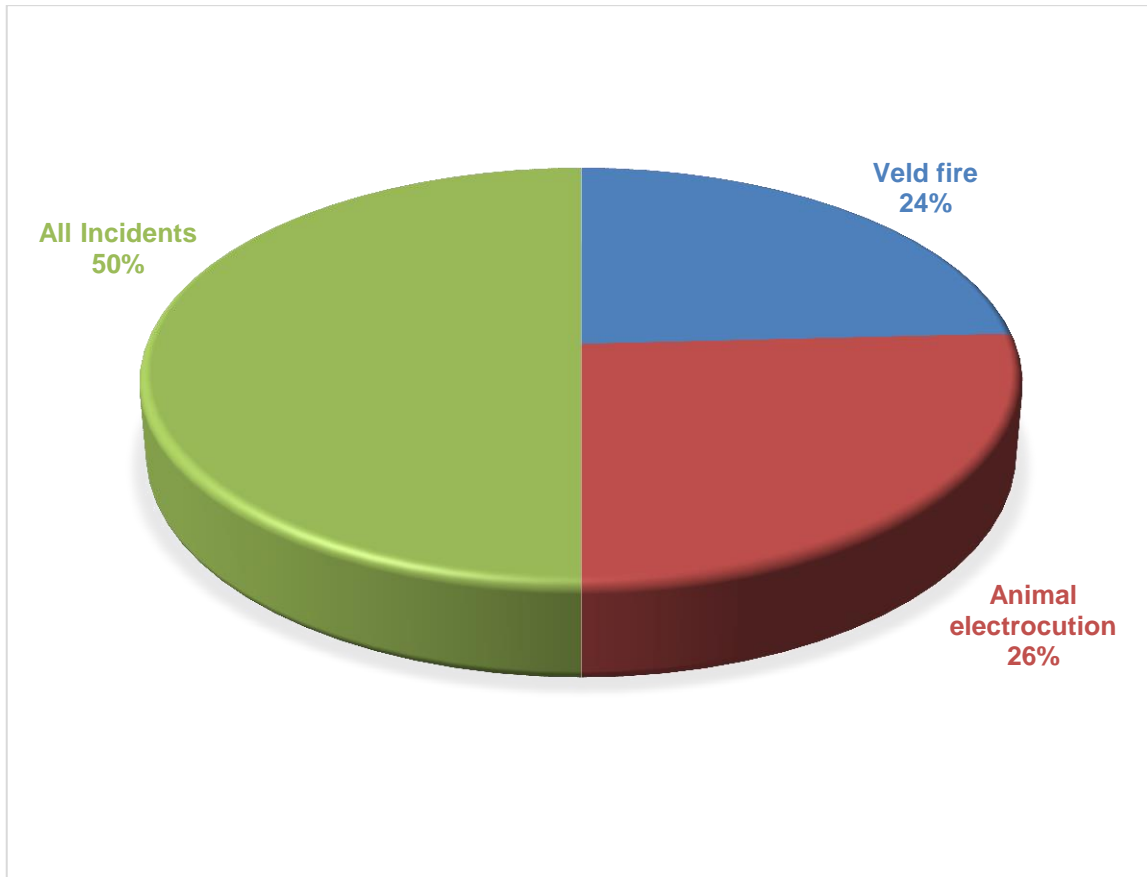
#### **4. 2. 6. Environmental Incident Claims**

Some environmental incident claims came in the form of liability for veld fires and animal electrocution as presented in Figure 4.23 below. The figure provides a clear understanding of what type of incident and the amount the Company had to pay for the incident claims. The Company was required to compensate affected people due to the inability of the Company to adhere to its compliance obligations to which the Company subscribed.

Winter et al (2008) explains that environmental liability does not relate to environmental damage because of a natural occurrence of exceptional, unavoidable and irresistible character as this event could not be justified as a failure to honour environmental obligation. Figure 4.23 below

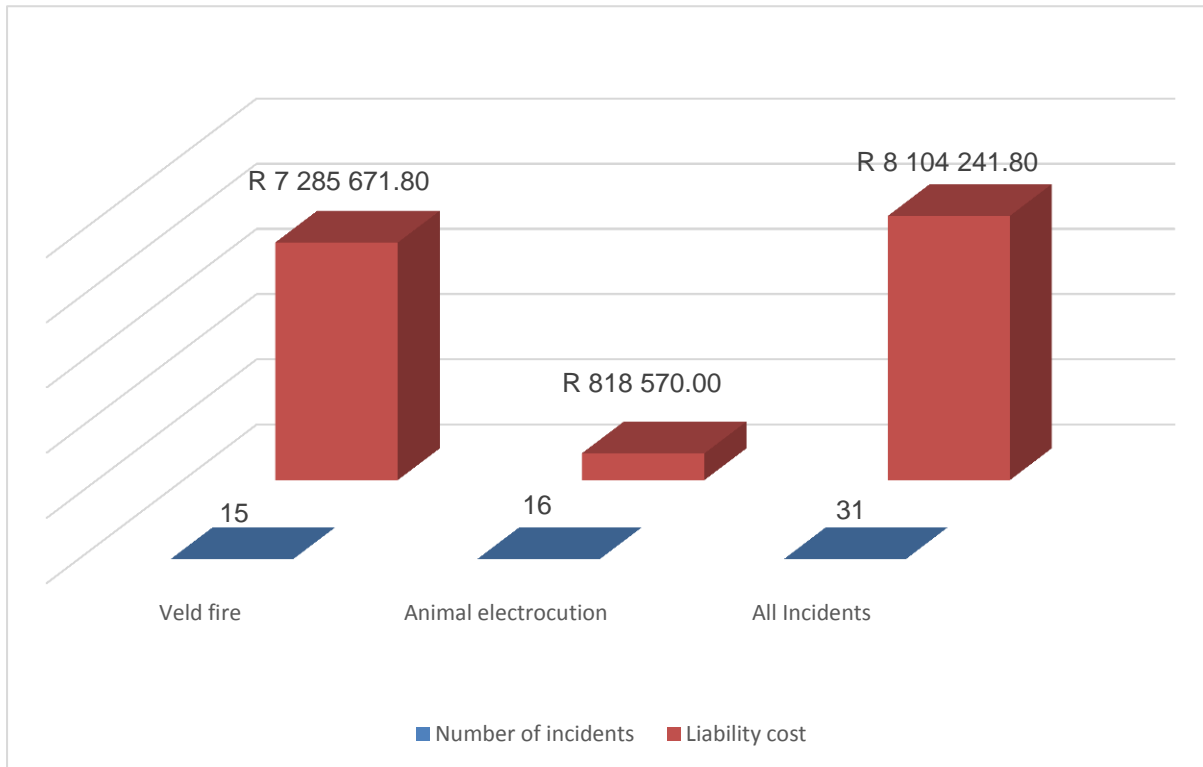
illustrates the claim amounts (in percentages) of all incidents from which both veld fires and animal electrocutions represent the highest percentages of claims.

Animal electrocution comprises 26% of environmental liability claims that have been imposed on the Company for the year 2014 and 2015, while 24% comprises veld fire environmental liability claims. The environmental liability cost illustrated below is for the period 2014 and 2015 only. The data for other periods could not be acquired at the time of concluding this study.



**Figure 4. 23: Environmental Liability Claims for the year 2014-2015**

Figure 4.24 below illustrates the number of environmental liabilities and the financial value assigned to the liabilities for both veld fire incidents and animal electrocution. These incidents were presented to the Public Claims Committee to either approve the claim or reject the claim, based on the proof on whether the Company had been negligent or not. The incidents were combined as per their types and amounts claimed.



**Figure 4. 24: Financial Cost for Environmental Liability Incident Claims 2014-2015**

### 4. 3. Discussion

It is important to note that the Kroonstad area did not have any bird mortality incidents for three years. The area (Kroonstad) recorded the bird mortality incidents in just under eight (8) months. This raised concerns as to whether the area had been reporting incidents in the previous years or not. The incident statistics is presented to determine the areas that have bird mortality incidents to help analyse the environmental obligations required and the associated obligations for improving ecologically sustainable development.

The oil spillage clean-up could not be conducted timeously in some instances due to the Company's processes which require an outage or work order to be booked and the substation power switched off after informing the affected customers. This illustrates that even though one might be aware of the issues that occur due to business operations and maintenance, it is an obligation to inform interested and affected parties prior to taking any action.

This finding of the research is mindful of three aspects of sustainable development which include: protection of the environment, social consideration and economic development while conducting business and the use of natural resources. It must be noted that achieving ecologically sustainable development requires more consideration by trying to balance the three aspects.

A fundamental goal of sustainable development is to preserve the availability of natural resources for future generations, minimise depletion of the resources and without exceeding the carrying capacities of the ecosystems (Harris, 2013; Rogner, 2010; Ford, 2015). For this reason, ecologically sustainable development requires no hurry to act without considering all other aspects such as money, interested parties and the ecological environment. One is therefore required to take reasonable measures to prevent the continuation of environmental degradation, whether temporal or not, until a suitable solution is found.

#### **4. 4. Summary**

In this chapter, the research findings were illustrated related to different environmental incidents experience by the Company, the actions and financial liability claims. The findings and results are from data were collected using different methods as mentioned in Chapter 3 (research methodology and design) to meet the research objectives; that is, the analysis of environmental obligations and liabilities of the Company to improve ecologically sustainable development. Some environmental incidents were reported and captured in the SAP EH&S Incident Management System to manage their life-cycle and some were discovered during site visits.

Environmental obligations and liabilities were discovered which obliged the Company to prevent, report and remediate the effects of the incidents. Additional measures included the appointment of contractors to perform the remediation of the effect on the environment and to compensate the contractor for the work done. The results of the research were presented in graphs, tables and figures to give a clear representation of environmental obligations and liabilities.

The respondents' extent of agreement with the statements were examined to determine the correlation with the data collected though other methods mentioned in the dissertation and the researcher found that there was a correlation between environmental obligations and liabilities to improve ecologically sustainable development.

## **CHAPTER FIVE (5): CONCLUSION AND RECOMMENDATIONS**

## **CHAPTER FIVE (5): Conclusion and Recommendations**

### **5. 1. Conclusion.**

In accordance with the research objectives, the main purpose of this research was an analysis of the environmental obligations and liabilities of a distribution division in the Free State Operating Unit of the Company, to improve ecologically sustainable development. The research was divided into different chapters to ensure that the research objectives are achieved, and questions are answered.

The Company has undertaken numerous activities which prompted some environmental obligations by executing a duty of care for environmental damage caused by the Company. These activities include environmental reporting of incidents that occurred, remediation of the negative effects on the environment and the compensation of those who were negatively affected by the Company's operational and maintenance incidents as required environmental legislative framework and the Company's business processes. The Company have subscribed to the SAP Environmental, Health and Safety Incident Management software to ensure that all reported environmental incidents are properly traced and tracked in their life-cycle to ensure proper implementation of the remediation/rehabilitation strategies.

Some environmental incidents were not reported to the Company and that illustrated a non-conformance with environmental obligations which requirement that everyone report environmental incidents. Respondents indicated that they neither agreed nor disagreed with the statement related to the reporting of incidents, which indicated that the Company's reporting obligation was not fully understood. The environmental obligation and liability to improve ecologically sustainable development is understood by many respondents, however most of the respondents believe that environmental training is required.

Additionally, many respondents are not sure whether they can be held personally liable for the failure to perform tasks on behalf of the Company. They believe if the Company was made liable through a contravention, they were not responsible, and the Company had to bear the consequences. In this case, ecologically sustainable development would be difficult to achieve.

However, at some cases the Company implements remedial actions for environmental incidents by initiating clean-ups or appointing a contractor to remediate or rehabilitate the effects of environmental damage on the Company's behalf. The clean-up of the oil spillage incidents were signs to illustrate that, the Company is aware of its obligations and liabilities. For this reason, the ecologically sustainable development could be achieved and ecologically integrity restored.

However, there is a public claims committee that oversees public liability claims to determine whether the Company failed to ensure execution of, among other things, the duty of care which is an environmental obligation and liability. The Company has not contravened any environmental

legal requirement which then clarifies the question of compliance with environmental legislation to ensure that environmental obligations are fulfilled.

However, the nature of the Company's operations and maintenance results in environmental obligations to take reasonable measures to prevent environmental degradation and pollution. The Company is then required to identify the areas that are problematic in relation to the types of environmental incidents and determine the root cause of such problems. In this research, it was found that oil spillage incidents mostly occur in the Welkom Sector, bird mortality mostly in the Kroonstad sector and veld fire and animal electrocution incidents occur often in the Bethlehem sector.

A link could be established that due to veld fire incidents that burnt the Company's wooden poles, the electricity distribution poles posed a risk of poles falling when it was windy, with conductor clashes leading to veld fires and animals coming into contact with the electricity. The Welkom area had lots of oil spillage incidents which are due to, among other things, vandalism by unknown persons as well as mechanical failures.

The Company understood some of environmental obligations that were required. However, there was still numerous employees who were not aware of their obligations. For this reason, they were not aware of their environmental liabilities associated with the failure to observe their duties of care for the environment. This led to failure to achieve ecologically sustainable development and the Company incur environmental and financial liability costs associated with compensation of the affected parties and remediation of the effect on the environment.

An environmental management option that enables the Company to achieve continual improve performance and ecologically sustainable development is the full establishment, implementation and maintenance of Environmental Management Systems (SANS, 2015) which force any Company or person to identify their environmental aspects and impacts and to determine the highest risks, compliance obligations and leadership commitment.

An environmental management system such as SANS EMS ISO 14001: 2015 is founded on the principles of planning, implementing, checking and continually improving on the Company's environmental performance. The Company is still at an early stage of establishing an Environmental Management System transition from the 2004 version to the 2015 version. The progress was not examined further as it was not the aim of the current research.

## **5. 2. Recommendations**

The research results indicate that the Company or any person is required to ensure that the environment is protected, social aspects are considered, and economic development is achieved while conducting business and that the use of natural resources is for the benefit of the existing and future generations. For this reason, everyone is required to ensure that he or she understands



his or her business activities, all the environmental aspects and impacts, including compliance obligations and the consequences of failing to achieve compliance.

Thus, based on the research findings the following are recommended:

1. There is a huge need for managing bird interaction-related incidents where the Company studies bird behaviour, works jointly with bird monitoring and management organisations and research institutions. Making proper recommendations and developing implementation strategies. Monitoring of existing bird-friendly implementation strategies is required so that the Company can be well prepared to ensure that bird mortality is avoided or minimised.
2. The Company has spent a lot of money on veld fires and animal electrocution incidents as shown from data collected from 2014-2015 in Figure 4.24. However, the data for the veld fires, animal electrocutions and financial data for oil spillage incident remediation for other years were not available.
3. The Company is then required to employ station guards to safeguard the Company's substations from unknown trespassers who may enter their substations. The Company is also required to cover or insulate the electric equipment and use bird-friendly structures to prevent bird electrocution and collision. A good relationship and open communication are required between landowners, or other interested and affected parties, with the Company, to minimise animal electrocution incidents since the landowners allow animals to come close to power lines which infringes or invades the clearance required.
4. To attain ecologically sustainable development, the Company is firstly required to understand its business activities, the environmental aspects and impacts, including compliance obligations. Ecologically sustainable development requires balancing the protection of the environment with social and economic development.
5. To manage veld fires, the Company should investigate and affiliate itself to existing fire association organisations to assist in managing veld fires where the Company operates. There is also a need to undertake research on vegetation management by liaising with the Department of Agriculture, Forestry and Fisheries and non-governmental organisations that are keen on protecting the environment. There must be service level agreements and contracts signed between the Company and service providers to deal with the oil spillage management and to investigate biodegradable or environmentally friendly methods to remediate the effects of oil spillage on the environment.
6. Ecologically sustainable development is dependent on environmental obligations and environmental liability being fully met. It is therefore paramount that a swot analysis be conducted, and compliance obligations understood, reasonable steps and measures investigated, and areas prioritised as per the type of incidents that occur. Environmental

training and awareness are crucial aspects which were identified by every respondent so that environmental obligations and liabilities are known, and improvement of ecologically sustainable development is achieved.

7. Environmental training is one major aspect that needs to be identified and rolled out to all personnel to ensure that they are aware of their environmental duties and personal liabilities as well as those of the Company to enhance the performance and subsequent improvement in ecologically sustainable development.

The next chapter provide a list of all the references used throughout this research project. It enabled the researcher to provide a reliable and trustworthy information about the main concepts of the research and the methodology used.

## **CHAPTER SIX (6): REFERENCES**

## CHAPTER SIX (6): References

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## **CHAPTER SEVEN (7): ADDENDA**

## CHAPTER SEVEN (7): Addenda

### Addenda 1: Consent Letter to Respondents



#### Consent to Participate in the Questionnaire

Dear participant,

I am Aphelele Tomsana, a Masters student at the Cape Peninsula University of Technology (CPUT) - Cape Town Campus and my student number is 207007195. I am conducting research on the analysis of environmental obligations and liabilities of the Company in order to improve ecologically sustainable development in partial fulfilment of Masters of Technology in Environmental Management

This research is important because it will assist academically in the field of Environmental Science and the Company in identifying gaps in environmental obligations, save money while improving ecologically sustainable development for the benefit of the present-day and forthcoming generations. I am a registered Certificated Natural Scientist (Cert. Nat. Sci.) registration number 300204/15 with South African Council for Natural Scientific Professions as per Natural Scientific Professions Act, 2003 (Act No. 27 of 2003) in the field of Environmental Science

Please be assured that:

- All information supplied on the research questionnaires will be treated as confidential.
- You will remain anonymous and no leak to signing this consent form and completing the questionnaire can be made as you are not required to insert your name on the questionnaire.
- You have the right to ask questions at any time before, during and after completing the questionnaire.
- You have the right to an interpreter, where practicable.
- You can withdraw at any time while answering the questionnaire.
- I invite you to be part of this study as it will contribute to the improvement of ecologically sustainable development.
- You can contact the researcher at any time after the study for any questions relating to the study at 073 706 7972 and email [apehelelet@hotmail.com](mailto:apehelelet@hotmail.com).

## Addenda 2: Questionnaire Form



**An analysis of environmental obligations and liabilities of a distribution division to improve ecologically sustainable development**

### QUESTIONNAIRE

#### Purpose of this study

South Africa has been interacting with other international states seeking to secure ecologically sustainable development. The Country has enacted environmental legislations to protect the environmental rights as specified in the Bill of Rights in the Republic of South African Constitution. In so doing, the rights have been encroached in such a way that they bring along environmental obligation and liability.

Worldwide, environmental scientists and government are trying to control operations and maintenance that have or could have damaging impacts on the ecological environment. Thus, deprives environmental advantage of the current and future generation. For this reason, this research seeks the analysis environmental obligations and liabilities of the Company's Distribution Division to improve ecologically sustainable development.

This analysis is anonymous; therefore, you may not write you name of the questionnaire so that it remains anonymous of the answer but reflect a true reflection of the situation. There is no WRONG and RIGHT answer. However, you are urged to be realistic when answering. The questions are important for the purpose of this study and research guarantees a total controlled discloser.

Thank you for your participation in this study.

#### HOW TO COMPLETE THE QUESTIONNAIRE

AFTER reading the question, please refer to the answers and mark with an X on the response category that corresponds best with your answer.

#### Example

1. Water pollution must be prevented.

Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*For Office Use Only*

Please indicate how much you agree or disagree with the following statements:

For office use only

STATEMENT	Strongly Agree	Agree	Neither Agree nor disagree	Disagree	Strongly Disagree	
1. Knowing the Company's activities, environmental aspects and impacts help identify environmental obligations and associated liabilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
2. When an environmental incident occurs in your area of operation, you are required to remediate the effects of that incident.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
3. The Company is not obliged to adhere to the Country's environmental legislation when the Company have its own legislations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
4. There is nothing reasonable the Company can do to stop the fire from spreading, as the fire is capable of jumping.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
5. All environmental incidents must be reported, irrespective of who caused the incident and extent of the impact on the environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
6. When working on behalf of the Company and environmental pollution occurs, you cannot individual be held liable for not preventing it or clean-up.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
7. Environmental Management Systems a best tool to attain ecologically sustainable development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
8. The Company cannot be found liable and punishable for disregarding Country's environmental legislations while the Company full comply with its environmental policy and legislations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>

CONTROLLED DISCLOSURE

Aphelele Tomsana (207007195) Candidate: Masters of Technology in Environmental Management

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Please indicate how much you agree or disagree with the following statements:

For office use only

STATEMENT	Strongly Agree	Agree	Neither Agree nor disagree	Disagree	Strongly Disagree	
9. There is no need to inform land owners about environmental incidents that occurs in their land.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
10. Ecologically sustainable development is achieved through preservation of ecologically integrity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
11. The Company's failure to prevent environmental damage deprives environmental rights of the current and upcoming generations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
12. Some environmental incidents are not reported to the Company for capturing into SAP EH&S Incident Management.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
13. The Company spend a lot of money for clean-up and compensation on environmental incidents due to the nature of its business.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
14. Environmental obligation means you have a duty to care for the environment at all times.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
15. Environmental liability means that you are accountable to a fine, compensation or clean-up of environmental damage caused by you actions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
16. Ecologically sustainable development means protecting the environment while promoting economic and social development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
17. Environmental training is required to provide environmental awareness to everyone in the business.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>

CONTROLLED DISCLOSURE

Aphelele Tomsana (207007195) Candidate: Masters of Technology in Environmental Management

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### Addenda 3: Questionnaire Analysis

This Addenda illustrates the number of questions or statements that respondents had to answer as per the research questionnaire in the addendum. This Addenda was developed to enable understanding of the data analysis of the research questionnaire results and findings in Chapter 4 of this study.

#	RESEARCH STATEMENTS IN LINE WITH RESEARCH QUESTIONNAIRE
Q1	Knowing the Company's activities, environmental aspects and impacts helps to identify environmental obligations and associated liabilities.
Q2	When an incident occurs in your area, you are required to remediate the effects of that incident.
Q3	The Company is not obliged to adhere to the country's environmental legislation when the Company has its own legislation
Q4	There is nothing reasonable the Company can do to stop the fire from spreading, as the fire can jump.
Q5	All environmental incidents must be reported, irrespective of who caused the incident and the extent of the impact on the environment.
Q6	When working on behalf of the Company and environmental pollution occurs, you cannot individually be held liable for not preventing it or cleaning it up.
Q7	The Environmental Management System is the best tool for attaining ecologically sustainable development.
Q8	The Company cannot be found liable and punishable for disregarding the country's environmental legislation while the Company fully complies with its environmental policy and legislation.
Q9	There is no need to inform landowners about environmental incidents that occur on their land.
Q10	Ecologically sustainable development is achieved through preservation of ecological integrity
Q11	The Company's failure to apply environmental management deprives the current and upcoming generations of their environmental rights.



#	RESEARCH STATEMENTS IN LINE WITH RESEARCH QUESTIONNAIRE
Q12	Some environmental incidents are not reported to the Company for capturing on the SAP EH&S Incident Management System.
Q13	The Company spends a lot of money for cleaning up and compensation for environmental incidents due to the nature of its business
Q14	An environmental obligation means you have a duty to care for the environment at all times.
Q17	Environmental training is required to provide environmental awareness to everyone in the business.

## Addenda 4: SAP EH&S incident Management Raw Data

Microsoft Excel - Addendum - FSOU Incidents from 2012

File Home Insert Page Layout Formulas Data Review View

Themes Colors Fonts Effects Margins Orientation Size Print Area Breaks Background Print Titles Width: Automatic Height: Automatic Scale: 45% Gridlines View Print Sheet Options Bring Forward Send Backward Selection Pane Align Group Rotate

G271 Witsieshoek substation

	B	C	D	E	F	G	H	K	U	V	W	X
	Status descrip	Event date	Event time	Event Description	Work Area Descrip	Accident Loc Descrip	Deso. of Plant for I/A Log Entry	Type of Contact: (Mandatory)	Area affected/damaged (m2)	Volume of spill:	Environmental Classification	Investigation Result
5	In Process	2017/08/17	07:23:00 PM	Animal Electrocutio	Free State OU Vaalpark CNC	Vaaldam Denver 22kV feeder	Distribution Division	Animal electrocutio				
20	Closed	2017/06/29	12:30:00 PM	Veld Fire	Free State OU Brandfort CNC	Kareef/Vetrevier 132 kV line	Distribution Division	Fire - Veld/Forest				@0P@1. Line inspection was done 25.04.2017 WO 501.13679104 2. Th
221	Closed	2015/10/25	11:54:00 AM	Animal electrocutio	Free State OU Reitz CNC	WARDEN/REITZ22KV [ WR215/52/30 ]	Distribution Division	Animal electrocutio				
222	Closed	2015/10/24	06:00:00 AM	Theft	Free State OU Reitz CNC	Petrus Steyn 33/22/11kv substation	Distribution Division	Theft				
223	Closed	2015/10/23	09:05:00 PM	Animal electrocutio	Free State OU Reitz CNC	Ras/Kabul 22kv [ RKB 204/83 ]	Distribution Division	Animal electrocutio				
238	Closed	2015/08/18	11:00:00 PM	Theft	Free State OU Project Execution	Themballille Electrification Project	Distribution Division	Theft				The cross arm broke due to stormy weather. @0P@1. ITS PLANNED INSIDE JOB BY ONE OF THE EMPLOYEES AND THE SECUR
240	Closed	2015/08/13	01:45:00 PM	veld fire	Free State OU Vrede CNC	WVK 206/4	Distribution Division	Fire - Veld/Forest			Environmental Event	@0P@1. Tree fell 2. Veld fire
243	Closed	2015/08/17	08:00:00 AM	Animal Electrocutio	Free State OU Vrede CNC	WVK 375	Distribution Division	Animal electrocutio				@0P@1. Stay rod closer to the white phase link 2. Cows electrocu
245	Closed	2015/08/05	04:00:00 PM	Theft	Free State OU Reitz CNC	Reitz CNC/RPS 511/12/17/10 & RPS 511/12	Distribution Division	Theft				@0P@1. Operator was dispatched to RPS522/12/17/10 2. Operator fou
247	Closed	2015/07/30	08:00:00 AM	veld fire	Free State OU Vrede CNC	YRS 90-74-53	Distribution Division	Fire - Veld/Forest			Environmental Event	@0P@1. Conductor on the ground 2. Red phase conductor broken
248	Closed	2015/07/08	12:00:00 PM	veld fire	Free State OU Reitz CNC	DS 185/115/5 & DS 185/115/8/1	Distribution Division	Fire - Veld/Forest	2,000,000 m2		Environmental Event	@0P@1. The farmer started the fire 2. Only two of Eskom's poles w
250	Closed	2015/07/20	07:15:00 AM	Theft	Free State OU Reitz CNC	Reitz CNC	Distribution Division	Theft				@0P@1. Missing locks on the vehicle boxes 2. Petrol drill and ch
269	Closed	2015/05/19	12:00:00 AM	Theft	Free State OU Vrede CNC	Vrede Munic	Distribution Division	Theft				Stolen Copper
271	Closed	2015/05/18	02:00:00 PM	theft	Free State OU Harrismitth CNC	Witsieshoek substation	Distribution Division	Theft				@0P@1. Thieves out the fence 2. Stolen earths 3. Busbar isolator
276	Closed	2015/04/24	03:00:00 PM	Theft	Free State OU Reitz CNC	Reitz Munic SS	Distribution Division	Theft				@0P@1. Substation fence was cut. 20 Switching room door lock was
282	Closed	2015/04/08	07:15:00 AM	Theft	Free State OU Vrede CNC	YMT SS4 and YTH M/S 2	Distribution Division	Theft				Mini sub cables stolen
283	Closed	2015/04/11	07:00:00 AM	Theft	Free State OU Vrede CNC	Vrede Munic	Distribution Division	Theft				@0P@1. Switch gear room door opened 2. Armoring and insulation c
293	Closed	2015/03/11	10:30:00 AM	Theft	Free State OU Vrede CNC	Vrede Munic	Distribution Division	Theft				
295	Closed	2015/03/06	10:44:00 AM	Veld fire	Free State OU Vrede CNC	YRS 90/74/42/21	Distribution Division	Fire - Veld/Forest			Environmental Event	
296	Closed	2015/03/01	08:00:00 PM	Theft	Free State OU Reitz CNC	Reitz CNC	Distribution Division	Theft				
302	Closed	2015/02/17	12:00:00 PM	veld fire	Free State OU Bethlehem CNC	SSB6868-77-32	Distribution Division	Fire - Veld/Forest			Environmental Event	
305	Closed	2014/12/02	12:00:00 PM	Stung by the Wasp	Free State OU Hoopstad CNC	Oppersmandrif 11kv feeder	Distribution Division	Insect bite				@0P@1. The employee was stung by a wasp and reacted 2 days after -
306	Closed	2015/01/26	11:50:22 PM	Eskom vehicle hits oc	Free State OU Zastron CNC	Between Rouxville and Zastron	Distribution Division	Motor vehicle accid				@0P@1. The employee was not injured in the accident. 2. The empl
307	Closed	2015/01/20	06:21:00 AM	Animal Electrocutio	Free State OU Vrede CNC	WVK690-7	Distribution Division	Damage to property				@0P@1. Pole on the ground 2. Two cows on the ground electrocuted
308	Closed	2015/01/26	05:30:00 AM	Theft	Free State OU Reitz CNC	Stand no. 162, Petsana township.	Distribution Division	Theft				

Sheet1 | Ready 118 of 748 records found | 70%

Microsoft Excel Addendum - FSOU Incidents from 2012 - Microsoft Excel

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E325 Giraffe got electrocuted

	B	C	D	E	F	G	H	K	U	V	W	X
	Status descrip	Event date	Event time	Event Description	Work Area Descrip	Accident Loc Descrip	Desc. of Plant for I/A Log Entry	Type of Contact: (Mandatory)	Area affected/damaged (m2)	Volume of spill.	Environmental Classification	Investigation Result
312	Closed	2015/01/18	12:02:09 PM	Animal electrocution	Free State OU Zastron CNC	DR 151	Distribution Division	Animal electrocutor				@0P@1. The STO received a call for a low hanging conductor. 2. O
318	Closed	2015/01/17	06:30:00 PM	Oil spill at Freddie's su	Free State OU Alma CNC	Freddie's Compressor Substation	Distribution Division	Oil spill		±1500L	Environmental Event	Vandalism due to theft
319	Closed	2015/01/07	10:00:00 AM	Oil spill incident at Har	Free State OU Virginia CNC	Harmony Mill S/S	Distribution Division	Oil spill		±5050L	Environmental Event	Vandalism - theft
320	Closed	2015/01/17	11:00:00 AM	Theft	Free State OU Vrede CNC	YMT SS7	Distribution Division	Theft				
323	Closed	2015/01/07	06:00:00 AM	Oil spill incident at Ho	Free State OU Alma CNC	Homestead S/S	Distribution Division	Oil spill		±9500	Environmental Event	Incident the result of vandalism
325	Closed	2015/01/02	12:00:00 PM	Giraffe got electrocuted	Free State OU Parys CNC	EVH 30H15/3 Parys CNC	Distribution Division	Animal electrocutor			Environmental Event	
	Closed	2014/11/11	03:20:10 PM	Cows electrocuted.	Free State OU Petrusburg CNC	PTRRS 41-30 up to PTRS 41-32	Distribution Division	Animal electrocutor				@0P@1. A cow was electrocuted due to a low hanging conductor due
327	Closed	2014/12/16	10:34:08 AM	Animal electrocution	Free State OU Dealesville CNC	SDW 597-9	Distribution Division	Animal electrocutor				@0P@1. The broken pole was rotten and it was identified as a cla
328	Closed	2014/12/07	09:27:03 PM	Oil spillage at Anglo D	Free State OU Virginia CNC	Anglo Dankbaarheid S/S	Distribution Division	Oil spill		50 L	Environmental Event	
330	Closed	2014/11/09	07:45:33 AM	Cows electrocuted	Free State OU Brandfort CNC	BC 95-85-36	Distribution Division	Animal electrocutor				@0P@1. The operator saw a leaning pole. 2. The customer confirme
338	Closed	2014/10/21	04:20:00 PM	Animal Electrocution	Free State OU Reitz CNC	DKF 123/83	Distribution Division	Animal electrocutor				
344	Closed	2014/10/02	12:00:00 AM	Oil spill at Zamdela Su	Free State OU Vaalpark CNC	Zamdela Substation	Distribution Division	Oil spill		240 LITRES	Environmental Event	Vandalism
345	Closed	2014/10/18	04:49:45 AM	Oil spilled from drain v	Free State OU Virginia CNC	Merriespruit 3 Substation	Distribution Division	Oil spill		±12625 LITRES	Environmental Event	Vandalism
347	Closed	2014/10/14	02:00:00 PM	Theft	Free State OU Bethlehem CNC	Arlington Town LV Network	Distribution Division	Theft				
349	Closed	2014/10/13	09:00:00 AM	storm damage	Free State OU Reitz CNC	Tweeling/Amandia 22kv feeder at TA 87	Distribution Division	Animal electrocutor				
356	Closed	2014/09/30	10:50:00 AM	Veld fire	Free State OU Vrede CNC	VRS 90/31	Distribution Division	Fire - Veld/Forest			Environmental Event	
360	Closed	2014/09/28	01:34:56 PM	Oil spill at Anglo Gedu	Free State OU Alma CNC	Anglo Geduld Substation	Distribution Division	Oil spill			Environmental Event	Technical error
361	Closed	2014/09/26	05:25:45 AM	Oil spill from an explos	Free State OU Virginia CNC	New Steyn Substation	Distribution Division	Oil spill		20 LITRES	Environmental Event	Technical error
364	Closed	2014/09/22	01:28:00 PM	Veld fire	Free State OU Harrismith CNC	Groenkop Kestell, GK	Distribution Division	Fire - Veld/Forest			Environmental Event	
365	Closed	2014/09/18	01:32:00 PM	Veld fire	Free State OU Harrismith CNC	Harrismith,SwineburnePietvllei,vanReen	Distribution Division	Fire - Veld/Forest			Environmental Event	
	Closed	2014/09/09	12:15:47 PM	Veld Fire	Free State OU Zastron CNC	DDW 331A/21/15	Distribution Division	Fire - Veld/Forest				@0P@1. The fault was discovered Friday but was not repaired or r
367	Closed	2014/09/04	01:30:15 PM	Oil spill at Midlands S	Free State OU Vaalpark CNC	Midlands Substation	Distribution Division	Oil spill	12 m2	1200 LITERS	Environmental Event	Vandalism by unknown persons
370	Closed	2014/09/17	02:30:04 PM	Veld fire under Exelsio	Free State OU Tweespruit CNC	Exelsior Munic 11kv Pole Number EL38	Distribution Division	Fire - Veld/Forest				
372	Closed	2014/09/18	07:00:00 AM	Oil spilled at Virginia R	Free State OU Virginia CNC	Virginia Reduction S/S	Distribution Division	Oil spill		±4900 LITRES	Environmental Event	
373	Closed	2014/09/03	10:00:50 PM	Oil spilled from TRFR	Free State OU Virginia CNC	Harmony Mill S/S	Distribution Division	Oil spill		±9500 LITRES	Environmental Event	Vandalism due to unknown persons
375	Closed	2014/09/05	02:00:00 PM	veld fire	Free State OU Bohlokong CNC	Clarens Brandwag 11kv feeder	Distribution Division	Fire - Veld/Forest			Environmental Event	
376	Closed	2014/09/05	12:00:00 AM	veld fire	Free State OU Harrismith CNC	SSR 83 w/o 501-8511078	Distribution Division	Fire - Veld/Forest			Environmental Event	
377	Closed	2014/09/05	01:43:00 PM	veld fire	Free State OU Harrismith CNC	GDS 85/55/31/15/3	Distribution Division	Fire - Veld/Forest			Environmental Event	
378	Closed	2014/08/25	02:43:00 PM	Veld fire	Free State OU Harrismith CNC	SMP 125	Distribution Division	Fire - Veld/Forest			Environmental Event	
379	Closed	2014/09/03	12:00:00 AM	veld fire	Free State OU Harrismith CNC	SW 197/12/12/3 w/o	Distribution Division	Fire - Veld/Forest			Environmental Event	
380	Closed	2014/09/01	12:00:00 AM	Veld fire	Free State OU Harrismith CNC	SW 318/26/75 and SW 318/26/94	Distribution Division	Fire - Veld/Forest			Environmental Event	
	Closed	2014/08/28	07:00:00 PM	Veld fire resulted in a F	Free State OU Frankfort CNC	Leeuw Farm - Frankfort	Distribution Division	Fire - Veld/Forest				@0P@1.Senior Technical Official was dispatched by RMC 2.While in
382												

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Addendum - FSOU Incidents from 2012 - Microsoft Excel												
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B312 Closed												
Status descrip	Event date	Event time	Event Description	Work Area Descrip	Accident Loc Descrip	Desc. of Plant for I/A Log Entry	Type of Contact: (Mandatory)	Area affected/damaged (m2)	Volume of spill:	Environmental Classification	Investigation Result	
Closed	2014/03/08	12:00:00 AM	Minor electrocuted	Free State OU Jacobsdal CNC	Pietvale Township Ritchie	Distribution Division	Contact with Electric				@0P@1. Children were playing outside the house near the tap wher	
Closed		04:33:00 PM	Veld fire	Free State OU Reitz CNC	DA 1155	Distribution Division	Fire - Veld/Forest	3,000,000 m2		Environmental Event		
Closed		06:29:00 PM	Veld fire	Free State OU Reitz CNC	RTV 96/3113	Distribution Division	Fire - Veld/Forest			Environmental Event		
Closed	2014/08/12	06:24:19 PM	Oil spill at Merriesprui	Free State OU Virginia CNC	Merriespruit 3 Substation	Distribution Division	Oil spill		±9000 LITRES	Environmental Event	@0P@1. Merriespruit 3 substation oil was drained from the bottom	
Closed	2014/08/12	12:00:00 AM	Theft	Free State OU Bohlokong CNC	Clarens Lesotho Bulk	Distribution Division	Theft				1. Stolen gate	
Closed	2014/08/08	01:00:00 PM	veld fire	Free State OU Bethlehem CNC	GRK/KST268 and GRK/KST269	Distribution Division	Fire - Veld/Forest			Environmental Event	@0P@1. Findings - The Eskom employee didn't report the incident imm	
Closed	2014/07/27	01:36:40 AM	Veld Fire	Free State OU Edenburg CNC	RESY821125	Distribution Division	Fire - Equipment				@0P@1. A shack burnt down on August 1, 2014. 2. The fire cause	
Closed	2014/08/01	11:00:28 AM	Shack burnt down	Free State OU Selosesha CNC	Ratau Stand 1255	Distribution Division	Fire - Building				@0P@1. The fire had spread 400 meters along the road and not on	
Closed	2014/07/20	05:30:06 PM	Veld Fire	Free State OU Tweespruit CNC	Excelsior Verkeerdevelei EV283167147	Distribution Division	Fire - Equipment			Environmental Event	Bird nest caused a fire	
Closed	2014/07/29	02:30:00 PM	Veld fire	Free State OU Vrede CNC	WHS259-113-71-1	Distribution Division	Fire - Veld/Forest			Environmental Event	1. Strong winds	
Closed	2014/07/17	02:15:00 PM	veld fire	Free State OU Reitz CNC	DS 146/48	Distribution Division	Fire - Veld/Forest				@0P@1. The employee was driving from Excelsior to Thaba Nchu to	
Closed	2014/05/30	07:15:58 AM	Eskom driver hit an ar	Free State OU Energy Protection	Excelsior	Distribution Division	Motor vehicle accide				@0P@1. Employee made use of his PPE. Protected areas were not	
Closed	2014/03/07	04:15:33 PM	Suspected skin diseas	Free State OU Control Plant maint	CPM	Distribution Division	Occupational Diseas				@0P@1. The incident was reported to the CNC the same day. 2. The	
Closed	2014/04/08	07:00:33 AM	Truck reversed on an	Free State OU Jacobsdal CNC	766 Virgo Street Pietvale	Distribution Division	Contact with Electric				@0P@1. Scrap poles and poles left from previous projects were st	
Closed	2014/06/29	03:30:33 PM	Fire burnt poles	Free State OU Ladybrand CNC	Ladybrand CNC	Distribution Division	Fire - Other				@0P@1. Burned grass, customer cable and pipes. 2. Eskom Equipmen	
Closed	2014/07/09	01:00:00 AM	Veld fire	Free State OU Frankfort CNC	HV349-48	Distribution Division	Fire - Veld/Forest				1. Strong winds	
Closed	2014/07/11	03:00:00 PM	veld fire	Free State OU Bohlokong CNC	Clarence Brandwag - CLB 94	Distribution Division	Fire - Veld/Forest			Environmental Event	Environmental Event	
Closed	2014/05/26	10:30:23 AM	Found skeleton of de	Free State OU Petrusburg CNC	PTPS 41-65-298 + 41-65-334	Distribution Division	Bird electrocution			Environmental Event	@0P@1. The oil spill was the result of a blue phase current transfo	
Closed	2014/07/07	09:00:00 PM	Blue phase CT on Lea	Free State OU Alma CNC	Euclid 132144KV Substation	Distribution Division	Oil spill			Environmental Event		
Closed	2014/07/09	09:30:00 PM	Pole mounted transfc	Free State OU Thabong CNC	Welkom - TEE 40/4	Distribution Division	Oil spill			Environmental Event	White phase conductor on ground	
Closed	2014/07/08	11:10:00 PM	veld fire	Free State OU Vrede CNC	AM 22/143	Distribution Division	Fire - Veld/Forest			Environmental Event		
Closed	2014/07/07	10:00:00 AM	Veld fire	Free State OU Harrismith CNC	harrismith CNC	Distribution Division	Fire - Veld/Forest			Environmental Event		
Closed	2014/07/06	08:00:00 PM	Transformer leaking c	Free State OU Bethlehem CNC	BTJ26T-42	Distribution Division	Oil spill			Environmental Event	Transformer was leaking oil	
Closed	2014/07/05	10:00:00 AM	veld fire	Free State OU Bethlehem CNC	GFM56-66-5	Distribution Division	Fire - Veld/Forest			Environmental Event	1. Strong winds.	
Closed	2014/06/28	03:30:00 PM	Veld fire	Free State OU Vrede CNC	VSD 85/48/1	Distribution Division	Fire - Veld/Forest			Environmental Event	@0P@1. Grazing field burnt 2. Overhead conductor on the ground	
Closed	2014/06/19	11:50:00 AM	veld fire	Free State OU Bohlokong CNC	Voorsfontein 22kv feeder (VFT189/18)	Distribution Division	Fire - Veld/Forest				1. Strong winds.	

## Addenda 5: Email sent to Respondents

Research Questionnaire 2017 - Message (HTML)

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From: **Aphelele Tomsana** Sent: Wed 2017/10/04 12:25 PM

To: George Mashee; George Garson; Kenosi Masisi; Mari Greyvensteyn; Motlatsi Kubu; Christopher Banda; Buti Rabotapi; Kobeli Harejane; Chris Van Eeden; Solly Molefi; Sauer Dondolo; Kenosi Masisi; Mari Greyvensteyn; Lefu Mofokeng; Margy Charlie; Simon Mekile; Buti Molebeleli; Seloane Van Wyk; Phil Mothekhe; Zane Moagi; Chris Van Eeden; Chris Venter; Abby Makolomakoe; Themba Modisaotsile; Joseph Lekhoaba; Pitso Ramalitsi; Muziwakhe Mazbuko; Meshack Mogoros; Johan Brits; Calle Van Der Nest; Cheryl Klassen; Zakhele Fuma; Mojalefa Lebajoa; Siyabonga Mhlanga; Teti Molapo; Trompie Terblanche; Zukiswa Moroto

Cc:


Subject: Research Questionnaire 2017

Message Questionnaire Form 2017.pdf (466 KB)

Afternoon Good Colleagues,


I must say its been long time without talking. I hope you doing good day by day. As you all know that I've been busy with Masters in Environmental Management until the end of 2017. I am about 90% on the final stages and only require the attached document to be completed by each and everyone of you. I understand you busy schedule and work demand. I just require this last questionnaire from you to ensure that the information stay relevant and truthful.

Kindly complete the attached document and please do not write you name on the document so that the answers stay confidential, as I only require the answers for my analysis.

Regards 

**Eskom**  
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1<sup>st</sup> Floor  
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| 086 609 1006  
[TomsanaA@eskom.co.za](mailto:TomsanaA@eskom.co.za)



See more about: Aphelele Tomsana.

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Cc:

Subject: Research Questionnaire 2017

Message Questionnaire Form 2017.pdf (466 KB)

Morning Colleagues,

I am a Candidate for Masters in Environmental Management, as some of you already know. I am finalising my research and required to send you a questionnaire to complete and send it back to me. For those who do not know, I obtained an ethics clearance letter from the GM in February 2016 to enable me conducting this type of research

Kindly complete the attached document and please do not write you name on the document so that the answers stay confidential, as I only require the answers for my analysis.

Regards .....

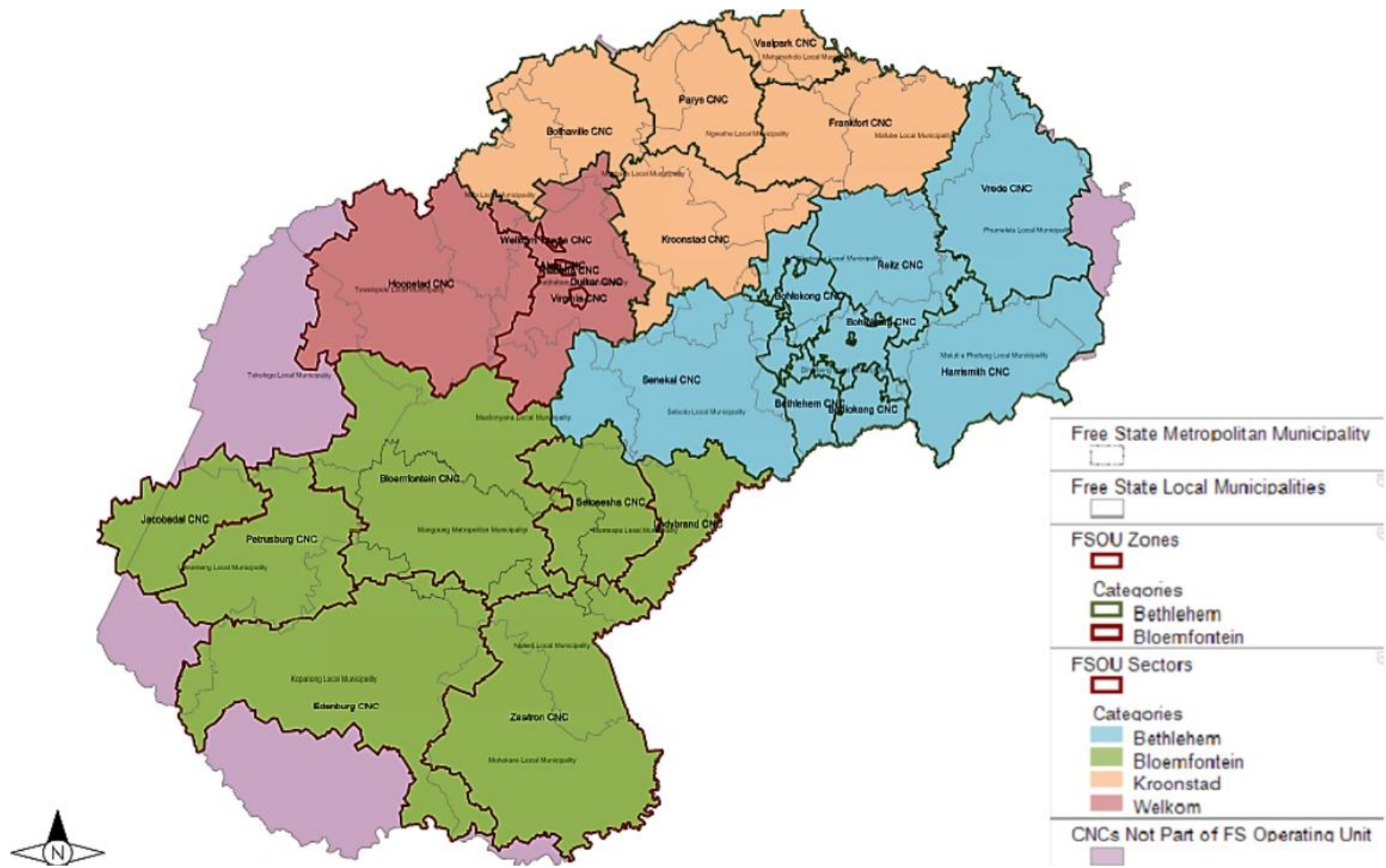
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Apehele Tomsana (*Cert. Nat. Sci./ MWISA*)  
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See more about: Apehele Tomsana.

## Addenda 6: Free State Operating Unit



## Addenda 7: The Company's Ethics Clearance Letter



**Date:**  
08 February 2016  
**Enquiries:**  
Mr Aphelele Tomsana  
**Telephone:**  
+27 51 404 2046

**To:** The Registrar  
Cape Peninsula University of Technology  
Cape Town Campus


### **ETHICS CLEARANCE: CONFIRMATION OF ESKOM INTELLECTUAL PROPERTY RIGHTS AND SECURITY CLEARANCE FOR MASTERS RESEARCH – MR. APHELELE TOMSANA**

This memorandum serves as an ethics clearance; confirmation of Eskom intellectual property rights and security clearance for the continuation of Masters level research and write-up by Mr. A. Tomsana. The research topic is "An analysis of environmental obligations and liabilities of the Eskom Distribution Division to improve ecologically sustainable development."

Mr. Tomsana has followed due internal processes in terms of gaining permission for this research.

It must be noted that this general clearance is for a limited period only, which will be for the rest of the financial year 2016 till end 2017, and in no way waives Eskom's Intellectual Property Rights.

Yours sincerely

  
\_\_\_\_\_  
**Aphelele Tomsana**  
Environmental Practitioner  
SHEQS: Environmental Management

Supported by E-Band

  
\_\_\_\_\_  
Lindi Mthombeni  
General Manager: Free State Operating Unit

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**Addenda 8: Cape Peninsula University of Technology Ethics Clearance Letter**




P.O. Box 1906 • Bellville 7535 South Africa • Tel: +27 21 953 8677 (Bellville), +27 21 460 4213 (Cape Town)

Office of the Chairperson Research Ethics Committee	Faculty of Applied Sciences
--	-----------------------------

The Faculty Research Committee, in consultation with the Chair of the Faculty Ethics Committee, have determined that the research proposal of APHELELE TOMSANA for research activities related to the MTech / DTech: MTech Environmental Management at the Cape Peninsula University of Technology requires / does not require ethical clearance.

Title of dissertation/ thesis:	An analysis of environmental obligations and liabilities of the Eskom Distribution Division to improve ecologically sustainable development
--------------------------------	---

Comments (Add any further comments deemed necessary, eg permission required)  
Research activities are restricted to those detailed in the research proposal.

 Signed: Chairperson, Research Ethics Committee	24/April/2017 Date
---	-----------------------

## Addenda 9: Declaration from Language Editor

DR CA ROBERTSON

MA (Critical Linguistics). DPhil (Curriculum Studies) (Stellenbosch University)

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Date: 16 February 2018

Editing of Master of Technology thesis

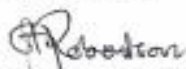
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I confirm that I have edited the following document submitted by **Aphelele Tomsana** in fulfilment of the requirements for the degree of Master of Technology in Environmental Management in the Faculty of Applied Sciences, Department of Environmental and Occupational Studies at the Cape Peninsula University of Technology, Cape Town, South Africa.

Research title	<i>An analysis of environmental obligations and liabilities of a distribution division to improve ecologically sustainable development.</i>
Editing services	Editing of five chapters and one addendum: correcting spelling and grammar mistakes; editing for consistency, style and flow. The checking and cross-checking of the references were excluded from the brief as requested.

The edited document was emailed to Mr Tomsana on 16 February 2018 with all the changes marked up using MSWord's Review (Track Changes). Mr Tomsana is responsible for accepting the editor's changes and ensuring that the references are correct. He is also responsible for the quality and accuracy of the final submission.

Yours faithfully



-----  
C. A. ROBERTSON

## **Addenda 10: Article Publication through U6 6th International Conference 2018**

### **An analysis of environmental obligations and environmental liabilities of a distribution division to improve ecologically sustainable development.**

Name of Authors\* - **Tomsana, A.** \* Itoba-Tombo. E. F. Human, I. S

\* Faculty of Applied Science, Environmental and Occupational Studies Department, Cape Peninsula University of Technology, South Africa.

#### **Abstract:**

**Keywords:** Environmental Protection • Environmental Obligation • Environmental Liability • Ecologically Sustainable Development

#### **Introduction**

Internationally, there is a growing concern about the protection of the environment while encouraging social and economic development for the benefit of the current generation without compromising the benefits of the future generations. South Africa still faces sustainability difficulties, although the country has embraced the concept of sustainable development (Bond & Morrison-Saunders, 2009).

#### **Methodology**

During this study, qualitative and quantitative methods were used. While, Independent variable (environmental obligation) and dependent variables (environmental liability and ecologically sustainable development) were identified to attain research objectives (Kvale, 2006; Creswell *et al.*, 2007). Respondents were selected through random sampling technique while, the reliability of the instrument was carried out using correlation coefficient test with a coefficient (+1) indicating positive relationship between variable (Sax *et al.*, 2003).

#### **Results and Conclusions**

The results of this study revealed that ecologically sustainable development could be compromised where environmental obligations and liabilities are not respected and adhered with. The Company performed some environmental obligations and adhered to environmental liabilities such as; remediating the effects on environmental pollution or degradation caused during its operations and maintenance.

The results are useful for any organisation within South Africa and globally to protect the environment, prevent loss of finances due to environmental liability costs and improve ecologically sustainable development for the benefit of the current and future generations.

#### **Conclusions**

Ecologically sustainable development can only be improved through a clear understanding of environmental obligations and obeying environmental liabilities. Additionally, environmental incidents hotspots must be identified, report environmental performance and prevent occurrence, continuity or recurrence.

#### **Acknowledgements**

The author would like to express his gratitude to National Student Financial Aid Scheme for their financial support in collecting data and writing of this paper. A special thanks to my supervisor(s) Dr. Elie F. Itoba-Tombo and Professor Izanne Susan Human for their support and guide throughout my research journey.

## References

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## Addenda 11: Article Publication Receipt email confirmation from Springer Nature.

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Dear Mr Tomsana,

Thank you for submitting your manuscript, An analysis of environmental obligations and liabilities of a Company's distribution division to improve ecologically sustainable development., to Environment, Development and Sustainability.

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With kind regards,  
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