

Chapter 1: Introduction

Water is a basic resource used for the production of steam and as a means of cooling in the power generation sector. Effective management of this resource is crucial since about 4.84 % of the available water resources in South Africa are used in the process of power generation including the water used in the mining of coal for power generation purposes (Wassung, 2010). This amounts to 640 Gℓ/year. The guardian of South Africa's water resources is the National Government, acting through the Department of Water Affairs (DWA). They have to ensure that all water resources are managed, conserved, protected, utilised, controlled and developed in a sustainable and efficient manner (Woodhouse, 2008).

Eskom, producing 95 % of South Africa's power, is one of South Africa's biggest water consumers, and therefore Eskom is responsible for establishing effective water management procedures and research initiatives. This must be done in order to contribute to protecting South Africa's natural water resources and conserve water in line with the national policy (Woodhouse, 2008). Eskom is acknowledging that water resources are limited by opting to rather use dry cooling and ash removal systems in new build projects. Due to this strategy being implemented, Eskom is currently saving more than 200 Mℓ of water per day (WBCSD, 2007). Other water saving projects include the desalination of mine water for re-use, minimising waste water and including water in the key performance indicators of power stations are implemented at some of Eskom's power stations (Pather, 2004).

1.1 Problem statement

The goal of water management within the power generation sector is to limit water consumption and to eliminate the contamination of natural water resources (Pather, 2004). The problem Eskom is currently facing is that older power stations that are still in operation (and will be in operation for at least the next twenty years) make use of large quantities of water for cooling and ash removal purposes. The management of these power stations may be struggling to focus on the management of water due to the fact that constant power supply to the grid is currently Eskom's first priority. It is also not clear how well water management policies and procedures are implemented and what management processes are in place to support these policies and procedures.

The National Water Resource Strategy (NWRS-2, 2012) released by the Department of Water and Environmental Affairs outlines the pressures on South Africa's natural water resources as well as the need to manage these resources wisely. Every power station, or power generation entity, has the responsibility to effectively manage their water consumption and save water while not compromising on generating power. This may not always be the case for older Eskom power stations and, since it is not clear how Eskom is performing, current water management practices must be analysed and deficiencies identified to clarify the position of these power stations within the context of their business processes and the South African water management framework.

1.2 Aim

The aim of this research is to discover how and how well water management is performed at older Eskom Power Stations within the greater water management framework existing at corporate and national level in South Africa.

1.3 Objectives

The objectives of the dissertation are:

- (i) Research and report the national legal system within which water management is performed in SA.
- (ii) Research and report the Eskom corporate policy framework within which water management is performed.
- (iii) Develop a water management framework based on research of the national legal system and the Eskom corporate policy for water management in the power generation sector of South Africa.
- (iv) Research, evaluate and report the business processes at power station (business unit) level by which water management is performed, Lethabo power station as a case study.

1.4 Structure of the dissertation

The structure of this dissertation as well as where the objectives given in section 1.3 are addressed within the dissertation is outlined in the paragraphs that follow.

The structure of this dissertation is based on a general framework design with a case study on ground level to illustrate how water is managed at business unit level and why it is managed in that way. The case study method was utilised because the author of this dissertation has little control over events taking place in the area of study and can only analyse the processes as they are implemented, making it difficult to perform a practical experiment.

Objectives (i), (ii) and (iii) are addressed in Chapter 3 where the national legal system and Eskom corporate policy is utilised to develop a water management framework for water management within the power generation sector of South Africa.

A case study that illustrates water management on business unit level is presented in Chapter 4 where objective (iv) is addressed. Lethabo serves as an appropriate representative case study since it was observed by the author of this dissertation that Eskom power stations utilise similar business processes. The case study will therefore attempt to illustrate water management implementation on business unit level, why it is implemented in that way and what is the result of such implementation.

Finally the findings are evaluated in Chapter 5 and conclusions and recommendations are given in Chapter 6.