The South African water management framework: Lethabo power station as a case study

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Abstract

South Africa is considered to be a water scarce country and it is estimated that by 2030 the water demand would have surpassed the water supply. There are therefore serious implications if all sectors of South Africa do not utilise natural water resources efficiently. The power generation sector is one of the more dominant water users, utilising more than 2 % of the available water resources. Since Eskom is guaranteed a 99.5 % water supply from the Department of Water Affairs, and they are planning to double their power generating capacity by 2030, accountability from Eskom's side is required to ensure water is managed according to South African standards.

Water management strategies in South Africa are subject to location due to the variation of water availability and water quality in the different regions. This requires some areas to have more strict regulations than other areas, but the basic framework within which water is managed are based on the same policies and strategies. For example, dry cooling technologies were initially only designed for water scarce areas, but Eskom has committed to implement dry cooling technology at all new build power stations even though it is more expensive in terms of capital cost and maintenance.

For the purposes of this study water management is investigated by means of a top down approach starting on national legislative level, then on departmental executive level, then on power generation corporate level and finally on power generation business unit level. A case study on business unit level is conducted at Lethabo power station to determine what the contributory factors to high water consumption are and what actions are required to rectify these problems. The aim of this research is therefore 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.

The strategic objectives of the power generation sector should include minimisation of the footprint of power generation on natural water resources by reducing water usage and implementing conservation strategies in order to make the power generation sector of South Africa a world leader in water management. With appropriate management, South African water resources can be utilised in such a way that it supports a healthy power generation industry as well as a growing population.

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List of abbreviations

AGNWC	Australian Government National Water Commission
CMA	Catchment management agency
CME	Compliance, Monitoring & Enforcement
CMS	Catchment Management Strategies
CW	Cooling water
DWA	Department of Water Affairs
EFP	Electric Feed Pump
EMS	Environmental Management System
GPE	Generation Primary Energy department
HOD	Head of Department
IDP	Integrated Development Plan
IWRM	Integrated Water Resource Management
KPI	Key Performance Indicator
LTPH	Long term plant health
MAR	Mean Annual Runoff
MCMPR	Ministerial Council on Mineral and Petroleum Resources
NEMA	National Environmental Act
NETL	National Energy Technology Laboratory
NWQMS	National Water Quality Management Strategy
NWRS	National Water Resource Strategy
PF	Pulverised fuel
PSM	Power Station Manager
RO	Reverse Osmosis
SE	System Engineer
SO	Sent Out
UAW	Unaccounted-for water
WBCSD	World Business Council for Sustainable Development
WMTT	Water Management Task Team
WRG	Water Research Group
WISA	Water Institute of Southern Africa
WMF	Water Management Framework
WTP	Water treatment plant
ZLED	Zero Liquid Effluent Discharge

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