

Chapter 5: Results and discussion

The case study presented in Chapter 4 revealed several interesting facts about water management in the power generation industry. The factors contributing to high water consumption as well as the corrective action required must be analysed from an operating as well as a managerial point of view. Contributing factors and corrective actions from an operational perspective is analysed in paragraph 5.1 and contributing factors and corrective actions from a managerial perspective is analysed in paragraph 5.2.

5.1 Operational perspective

Plant optimisation in terms of water consumption control is required for all power stations to ensure that they are utilising water resources efficiently.

5.1.1 Factors contributing to high water consumption

Factors affecting the water consumption rate negatively at Lethabo as observed by the author of this dissertation were:

- ***The cost of water to Eskom does not reflect its true economic value as a production resource*** - If this value was set to a more realistic level, some of the suggested water conservation methods may prove to be economically feasible on the business unit level in the power generation sector.
- ***High water levels at the ash dump*** – High levels can result in ponding and compromise the ash porcelinic properties and cause leaching (mobilising) of salts in the long term.
- ***Often higher than predicted evaporation rate at cooling towers*** – This is due to high ambient temperatures or low plant thermal efficiency.
- ***Lethabo is not recovering the contracted amount of mine water*** – Relying more on water from the river than necessary.
- ***In some seasons, lower than expected rain fall contributes to the higher than targeted water consumption*** – This is due to the fact that more water from the river is required for cooling water as well as dust suppression.

5.1.2 Corrective action to reduce water consumption

The actions required to improve the plant performance in terms of water consumption from an operational perspective:

- Value added to water from executive or corporate level, if not in terms of increased cost, in terms of incentives to power station personnel if water targets are reached.
- Recovery of water sent to the ash dump to prevent the degradation of the porcelinic base of the ash dump and also to reduce the amount of raw water consumed.
- To reduce the high evaporation rate at cooling towers, the thermal efficiency of the plant must be improved.
- Utilise more mine water – Optimise mine water treatment process.
- Maintain plant as per design to ensure longer plant life and less breakdowns, resulting in lower water usage.
- Utilise rain water effectively and possibly utilise ground water captured in the voids underneath the power station to reduce the amount of water consumed from the river.

5.2 Managerial perspective

Water management is required for all power stations to ensure that water resources are conserved and utilised in a sustainable and cost effective manner with the goal of minimising environmental impact.

5.2.1 Factors contributing to ineffective water management

Factors contributing to ineffective water management in the power generation sector on business unit level, based on results of the case study given in Chapter 4, are as follow:

- Knowledgeable and experienced personnel are too overloaded with other work and responsibilities to be concerned about efficient water management practices.
- Not enough knowledgeable and experienced personnel to train and inform others.
- Few guiding structures in place which make it difficult to obtain information.
- Not enough encouragement from management for personnel to be serious about water conservation.
- Conflicting priorities in terms of water consumption reduction and increased power production requirements – Increased power production is first priority even if it results in water consumption being above the targeted value.

5.2.2 Corrective actions required

The following managerial actions on Business Unit level are recommended as a result of the case study provided in Chapter 4 to enforce water management more effectively:

- Senior personnel, knowledgeable on the WTP plant and its problems must be appointed to train and guide junior personnel on site to ensure valuable knowledge are not lost.
- Water management training for operating and engineering personnel is required in terms of water management practices and the importance thereof.
- The structure and reporting channel of water management must include all relevant parties, like the system engineer and production team, to be able to enforce better water management practices.
- Ensuring water conservation policies are implemented effectively even if it requires reduced production of power, thereby effectively adding value to the water conservation drive.