

Development of a comprehensive monitoring and auditing tool for oxidation ponds systems in the Middle Vaal and Upper Orange catchment areas

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Abstract

An investigation of the current status of municipal sewage pond systems in the Free State region was undertaken to provide the Department of Water Affairs and Forestry (DWAF) Free State Regional Office with a strategic decision support tool to evaluate the current status of sewage pond systems in order to provide base-line information required by the Department. This will also contribute to a healthy environment by ensuring that strategic environmental issues associated with sewage systems are identified and that potential strategies for impact minimisation and prevention are implemented. This paper provides feedback on the background to the study, literature review conducted, the tool developed that can be utilised to assess pond systems and its outputs. This tool must be seen as a positive evaluation tool to ensure good management of pond systems to promote a healthy environment.

Keywords: waste stabilization ponds, health, environment

Introduction

In the Free State Province of South Africa municipal wastewaters are principally treated via activated sludge plants, trickling filter plants, rotating biological contactors (RBCs) and pond-based systems. A significant proportion of the municipal wastewater systems in the Free State are pond-based, with some 45 systems utilising waste-stabilisation ponds alone, and an additional 15 systems utilising ponds with additional unit processes (e.g. trickling filters) (i.e. a total of 60 pond based systems in the Free State). These waste-stabilisation pond systems, referred to as oxidation ponds, have for many years provided an effective and low-unit cost means of handling domestic wastewater from the smaller communities of the Free State. The waste-stabilisation ponds of the Free State have generally performed well for many years, effectively preventing environmental pollution and associated health impacts. Nevertheless, recent concerns have arisen as to the current operational state of waste-stabilisation ponds of the Free State and their impact on both the natural environment and human health.

An indication that problems exist within pond systems could include the following:

- Complaints relating to the failure and/or poor condition of waste-stabilisation ponds
- Indications of intent to take legal action against local authorities because of the poor conditions that exist at pond systems and the associated environmental and health impacts

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- Insufficient information regarding the operational status of waste-stabilisation ponds, and the effectiveness of the management thereof by local municipalities.

As the designated water sector leader tasked with inter alia regulatory oversight of the water services sector, the Free State DWAF office determined to initiate a study into the waste-stabilisation ponds of the Free State. In brief, the focus of the study was to:

- Determine and document the current status of waste-stabilisation ponds in the Free State
- Develop a simple strategic decision support tool to guide interventions as may be required.

Experiences gained and best practice guidelines from the study are presented in this paper. They could thereafter be directly utilised by Water Services Authorities (WSAs), DWAF and other government institutions (e.g. Department of Local Government and Housing (LGH), Department of Health, etc.) and industries to assist in effective management of pond systems throughout the Free State.

Objectives

This paper is aimed at providing assistance to WSAs, for better management of pond systems. In achieving this, the following will be briefly described:

- Literature review
- Process followed to conduct the study
- Development of the scoring and risk assessment tools
- Outputs of the tool
- Issues of concern.

The following sections report on the key issues from the literature. The development of both an Excel-based tool for