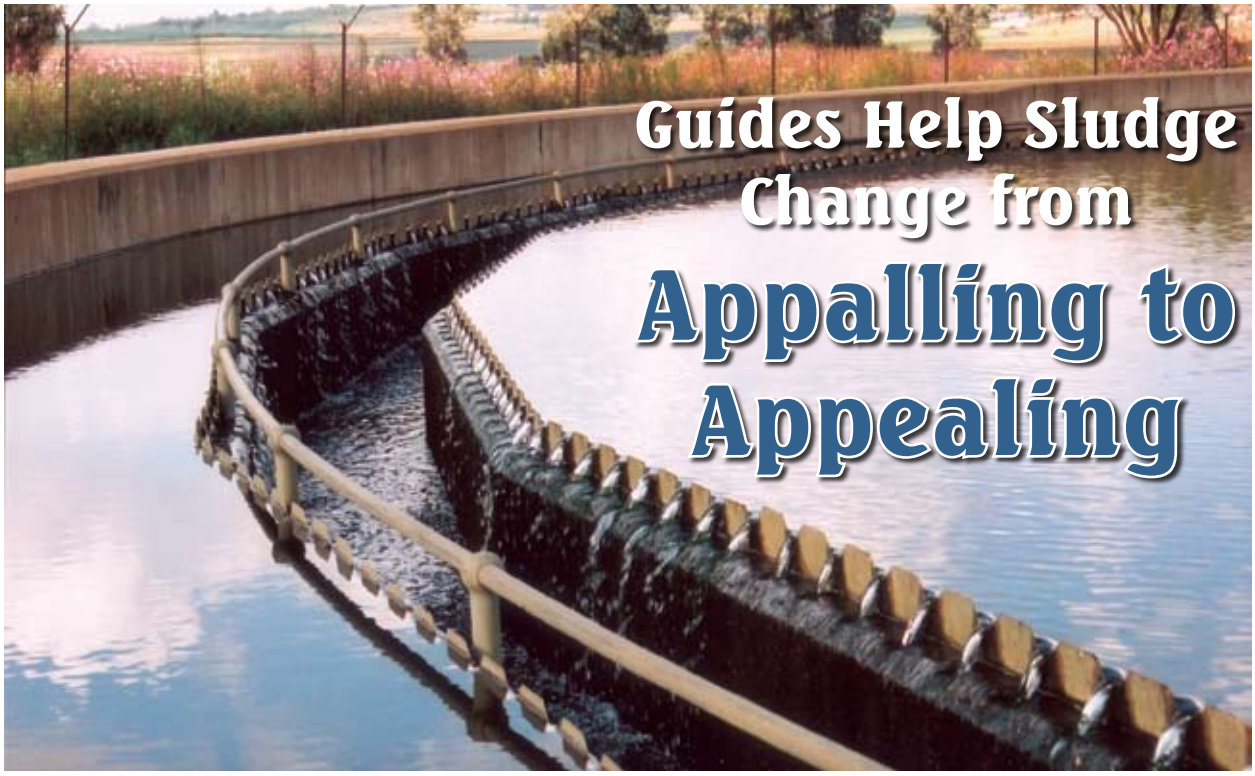

Guides Help Sludge Change from Appalling to Appealing

The sustainable management of sewage sludge is a critical element of the wastewater treatment process. While improper management can lead to health and environmental risks, good management practices can see sludge being reused for the benefit of municipalities and the communities they serve. Lani van Vuuren reports.

Sludge, the solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works, is mostly still seen as a waste product in South Africa. There is still little beneficiation taking place outside the large metropolitan centres, despite international trends to the contrary. However, adequately treated, good quality sludge, if managed properly, can be reused without harming the public or the environment.

In 2003, the Water Research Commission (WRC) and the Department of Water Affairs & Forestry (DWAF) launched a joint initiative to develop a series of guidelines dealing with all wastewater sludge management practices. Compiled following a comprehensive stakeholder consultation process, the guidelines are aligned with updated South African laws and regulations pertaining to the environment, waste and water. Moreover, the guidelines support the principles of sustainable use of resources and are in line with international trends and practices.

Each sludge management option is being developed as a separate guideline document. This simplifies the guidelines for users (including regulatory authorities, managers, practitioners and operators), as each document focuses on the management, technical and legislative aspects associated with a particular option. Volume 1 focuses on selecting the appropriate management options for the sludge streams generated by a specific wastewater treatment plant.

CLASSIFICATION PROCESS

Among others, this volume guides the user through the sludge classification process, a crucial step before any management option can be selected, explains WRC research manager Dr Heidi Snyman. “The better the quality of the sludge, the more management options are available. Certain types of sludge bring with it certain restrictions, for example, sludge with a high microbiological and metals content may not be used in agricultural applications.” Once a suitable management option has been selected, the user is referred to the relevant volume that deals with the selected management option.

For wastewater treatment plants that have sludge of a good enough quality to be used for the production

of crops, Volume 2 deals with the requirements for agricultural application. This volume may also be used to manage compost containing sludge that is not distributed to the general public for use.

The potential benefits of the nutrients (nitrogen, potassium and phosphorus) as well as the high organic carbon content of sludge have been well demonstrated. Sludge can also assist in increasing the organic content of the soil.

It is believed that subsistence and small-scale farmers can particularly benefit from the agricultural use of sludge, since the farmer will benefit financially due to savings on commercial inorganic fertilizers. However, as with the widespread use of inorganic fertilizers or organically rich products, such as manures, potential negative effects on environmental resources need to be managed. These issues are all addressed in the second volume.

SAFE DISPOSAL

While beneficial use is encouraged, it is recognised that not all sludge generated can be used safely. For this reason, guidelines have also been developed for the on-site and off-site disposal of sludge (Volume 3). Dr Snyman points out that sludge that cannot be used beneficially is regarded as waste and should be managed as such. "As with waste disposal in general, the negative effects on environmental resources need to be managed. Therefore sludge disposal must be controlled effectively and monitored for the protection of human and animal health, water resources and overall land quality."

Volume 4 deals with requirements for the beneficial use of sludge at high loading rates. These include using sludge in the rehabilitation of mine tailings, as landfill cover, and for industrial agriculture (such as growing cotton or lawn cultivation). There are also opportunities for once-off applications, such as the development of new golf courses, or the establishment of vineyards and fruit orchards.

COMMERCIAL PRODUCTS

Lastly, Volume 5 deals with the requirements for thermal sludge management practices and for commercial products containing sludge. Incineration is a costly process, however, even when sludge is incinerated the resultant ash can at times be used beneficially to offset some of the costs. These include products such as bricks and artificial rock and pumice.

Many innovative product applications have emerged internationally, for example, in some Asian countries sludge-derived artificial marble is being used to create tombstones. While it is recognised that many of these applications are not financially viable in South Africa, the last volume does provide guidance on how to implement such a process in the local legislative environment.

Volumes 1 and 2 are already available, while Volume 3 was being finalised at the time of writing. The stakeholder consultation process for Volumes 4 and 5 have been completed, and these guidelines should become available early next year. In the interest of transparency, the scientific basis, assumptions and thought processes were also documented as separate documents that are available from the WRC.

There has been an overwhelmingly positive response to the guideline development process, illustrating a clear need for such a series, reports Dr Snyman. The latest round of workshops, which included training on the first three volumes and stakeholder consultation on remaining two volumes, attracted double the expected numbers. The workshops were hosted by DWAF and the WRC in association with the Water Institute of Southern Africa's Anaerobic and Sludge Processes Division.

These workshops also identified other requirements within the wastewater sector, including the need for guidelines on the management of on-site sanitation sludge as well as sludge from drinking water treatment processes. Investigations into the latter have already started under a new research project funded by the WRC.

In some of South Africa's metropolitan centres sludge is being dried and reworked into compost for the agricultural sector.

- To order *Volume 1, Selection of Management Options* (WRC Report No **TT 261/06**) or *Volume 2, Requirements for the Agricultural Use of Wastewater Sludge* (WRC Report No **TT 262/06**), contact Publications at Tel: (012) 330-0340 or E-mail: orders@wrc.org.za