

## EXECUTIVE SUMMARY

Recent changes to South African legislation place more emphasis on the prediction of a mine's impact on the environment both now and in the future. The use of predictive models, therefore, is becoming a more important aspect of mine water management. This includes the use of models for internal water reticulation (such as stormwater management and water balances) and for external applications (such as effluent discharge options and geohydrological impacts).

Although this approach to predicting the impact a mine may have on the surface water environment is to the benefit to all the users of the catchment water resources, a reality is that most mines do not have the resources to undertake such modelling in-house. There is a need therefore, to provide some mechanism whereby mines and regulators can obtain independent evaluations of water models in order to assist in the decision-making process.

This project was aimed at identifying those models which are currently in use in South Africa, as well as those models which could be used, but which are currently only used internationally. In terms of the mining environment, there are a number of areas where no locally used model is available, and consequently potential options need to be identified from overseas. This is particularly relevant in the areas of geochemistry and acid generation. It was this motivation that resulted in the development of internet web site which evaluates a range of typical water models and which makes this evaluation available to anyone with access to the internet

The research project team identified the following modelling areas: hydrology, water quality, geochemistry, groundwater and water and salt balances. The team investigated three global types of model: firstly those which are freely available, widely used and can be downloaded from the Internet; secondly, those which must be bought from the supplier; and thirdly, models which need not be bought, or which cannot be bought, but which can be run by the supplier.

Details provided about the models include:

- availability
- applicability (strengths and weaknesses)
- usability
- data requirements
- computer requirements
- case studies (local and international)

This site has been developed and is located at:

<http://www.ccwr.ac.za/iscp>

The original intent with web site was to populate it with up to 50 models. This has not been achieved during the course of the project for a number of reasons:

- The project team evaluated the models used by them and in which they had sufficient expertise to evaluate the model. This restricted the number of models.

- Appeals were made by way of personal letters, letters to organisations and numerous publications in a variety of periodicals for anyone with models to approach the project team for the inclusion of their model on the site. This proved to have little success.

In the end, a total of thirty models were evaluated and are included in the web site. It is hoped that as the web site becomes more widely known, additional models will be added to the site and that a larger number of models will be available to the end-user.

The site will be maintained and upgraded periodically by the Water Research Commission.