

PREFACE

The gold mining industry buys large quantities of water from Water Boards for consumption within mines. Because of the ever increasing demand on South Africa's limited water resources and the gradually deteriorating water quality, the cost of high quality Water Board water is increasing steadily.

The use of water for mining results in significant increases in the salt content of the water, making it more corrosive and scale-forming, and this in turn dramatically affects operating costs of mine water reticulation systems. To counteract the build-up of salts in these systems, saline return mine water has to be disposed of, in certain instances to public water bodies. This has resulted in problems with downstream use of the public water, and consequently, the polluters have come under scrutiny from the water authorities. This problem is expected to take on serious proportions in the next 5 to 10 years.

A solution to the aforementioned problems is desalination of the mine water. No two mine waters are identical; however, they may be broadly classified into two distinct groups which are defined as those mine waters which have a scaling potential with respect to calcium sulphate, and those that do not. The latter waters are essentially sodium chloride containing, or brackish waters. COMRO has reviewed conventional desalination technologies and identified the electro dialysis reversal (EDR) process as a technique which holds considerable potential for the desalination of such mine waters.

This report describes the test work carried out on an Electro dialysis Reversal (EDR) pilot plant treating underground mine service water at the Beatrix Gold Mining Co Ltd. - a brackish water with a low calcium sulphate content. It is shown that the plant operated well on this type of mine water, producing a good quality product water. The work is considered definitive and no further test work on this type of feed water using the EDR process is required. Sufficient data are available

to make realistic projections for full-scale application of this process. Cost estimates have been made for a typical full-scale plant.

D G WYMER
Director
Underground Environment