STRATEGY STEERING COMMITTEE OF THE VAAL RIVER SYSTEM
PROGRESS REPORT
November 2010

1. INTRODUCTION

The third meeting of the strategy steering committee (SSC) was held on 21 October 2010 to discuss the progress with the implementation of the Reconciliation Strategy for the Vaal River System (VRS).

The meeting was attended by 43 stakeholders representing key national and provincial government departments, municipalities, water service providers, industry and Non Governmental Organisations as well as agriculture. (The membership list of the SSC is attached to this report as Appendix A.)

Comprehensive progress feedback on each strategy action was given by representatives of the responsible organisations. Revised water balance and reconciliation scenarios were presented for adjusted intervention targets and based on results from sophisticated system analysis simulations.

The conclusions from the water balances are that sufficient water can be made available until the year 2050 **only** if all the actions are implemented and the set targets are achieved.

The strategic actions needed are:

- Eradicate unlawful irrigation water use (estimated to be between 180 and 220 million m^3/annum) by the year 2013.
- Continue with the implementation of Water Conservation and Water Demand Management (WC/WDM) to achieve further target savings of 180 million m^3/annum by the year 2015.
- Implement Phase 2 of Lesotho Highlands Water Project (LHWP) to deliver water by the year 2020.
- As the next step in the implementation of the Water Quality Management Strategy for the Vaal River, a feasibility study for the desalination of mine water effluent (Acid Mine Drainage) to be commissioned by the year 2014 should be carried out.
- Undertake feasibility studies of a yield replacement scheme in the Orange River System for implementation by the year 2034. (Yield replacement is required to compensate water users in the Orange River System for the water to be transferred by the LHWP Phase 2).

A summary of the progress with each strategy action, as well as the response from the SSC is given below. The progress reports presented to the SSC are given in Appendix B.

2. IMPLEMENTATION OF STRATEGY

2.1. Eradication of unlawful irrigation water use in the Vaal River System

The eradication of unlawful water use is putting the VRS at risk. A professional service provider (PSP) has been appointed in June 2010 for a three year project to address the unlawful water use in the three Water Management Areas (WMAs) - Upper, Middle and Lower Vaal.

It is unlikely that the original target date of 2011 for the eradication of all unlawful use in the VRS will be met. Preliminary findings from the study show that in the upper Vaal WMA, 43% of the alleged volume of unlawful water use occurs on only 9.7% (83) of the properties. The approach therefore is to focus on the top 100 illegal water users in each WMA as the immediate priority activity. The target set for the Upper Vaal WMA is to address users using more than 100 000 m^3/annum illegally (90% of illegal volume) before the end of 2011.

The development of Regulations required to enforce legal water use is at an advanced stage and once internal departmental consultations with management have been concluded, the Regulations will be published for public comment.

2.2. Reduction in municipal water use by 15% through Water Conservation and Water Demand Management

In response to a request at the previous (second) SSC meeting, the four largest Gauteng municipalities (City of Tshwane Metro, Johannesburg Metro, Ekurhuleni Metro and the Emfuleni Local Municipality) reported on their respective progress with the implementation of WC/WDM.

The saving targets for these four municipalities represent 95% of the total targeted savings of Project 15%. According to the water use data, there has been a total saving of 77million m^3/annum by the nine large municipalities. This was achieved through both water loss and water use efficiency measures, such as tariff increases and stepped tariff structures.

Revised target saving scenarios were presented and it was agreed that additional savings of 180 million m^3/annum must be achieved by 2015 through implementing loss reduction measures.

The SSC noted that much still needs to be done to reach the target of 15%. A common constraint affecting virtually all municipalities is a lack of funding or uncertainty how to access funding and/or grants for WC/WDM projects. The SSC recommends the DWA should assist the municipalities by informing them of how to access funding.

Analysis of the data of all the water users supplied by Rand Water revealed that although the above reported savings occurred in the large municipalities, the total Rand Water supply for the year 2009 did not show any saving compared to the scenarios formulated in 2009. This indicates the actual water use in 2009 for the other smaller users (about 20% of Rand Water's supply) was higher compared to the water use scenario projection for the same year. It was recommended that further detail assessments of the potential for savings by these other users need to be carried out.

2.3. Re-use of treated effluent to augment water supply by 2014

Evaluations of options for managing the effluent from the gold mines indicated that if the highly saline mine water is pre-treated and discharged into the rivers (after the underground mined compartments filled), substantial volumes of dilution water will be required (releases from Vaal

Dam) over the medium to long term. This will maintain the Vaal and Sterkfontein dams at such low levers that the assurance of supply in the Upper Vaal will be severely jeopardised. In addition the discharge and dilution option will result in large quantities of unused water of poor quality flowing into and spilling from the Bloemhof Dam as wastage. The implication thereof is that additional augmentation, such as the Thukela Water Project will have to be implemented as soon as possible.

As an alternative to the above option, the analysis show that if the mine water is desalinated and treated to suitable quality for urban supply the wastage from Bloemhof Dam is eliminated and it will be possible to maintain a positive water balance until the year 2050 (also implementing the other strategy measures).

Given these findings it is recommended that further feasibility studies be carried out where the desalination of the mine effluent should be evaluated in context of the mentioned benefits.

It was also reported at the SSC that Government has appointed an Inter Ministerial Committee (IMC) to address the acid mine drainage (AMD) issue. At the first meeting of the IMC a team of experts were appointed to compile a report that will be taken to Cabinet which will take a decision on the measures to be implemented and where and how funding will be sourced.

2.4. Implementation of Phase 2 of the Lesotho Highlands Water Project

It was reported that Phase 2 of the Lesotho Highlands Water Project (LHWP) to deliver water to the VRS by 2019 is back on track after almost being derailed. Lesotho has a serious electrical energy shortage and wishes to become more energy independent and therefore wanted to revise the agreed layout of the proposed scheme to maximise hydropower generation from Phase 2.

Lesotho also wanted to change the delivery schedule to transfer the full yield of Phase 2 from the earliest possible date. This was investigated using system analysis simulations and found to pose a serious threat to the long term water security of the VRS and substantially reduces the benefits to South Africa. It would have also required the yield replacement dam on the Orange River to be built at a much earlier time. These disadvantages were pointed out to Lesotho in high level negotiations which lead to the decision of reverting to the original Phase 2 layout.

Detailed negotiations and protocols for the implementation of the scheme are underway and should be sorted out in the next 12 months. This will include considerations of other power supply options for Lesotho such as a major pumped storage project which would be jointly investigated. The selected layout and water transfer methodology will unlock the full benefit of the investment in LHWP for the Vaal River water users.

The SSC was also informed that on 12 August 2010 a Declaration of Intent was signed by the Heads of State of South Africa and Lesotho for the implementation of the scheme.

2.5. Implementation of the Water Quality Management Strategy for the Vaal River

The VRS is experiencing serious water quality problems but this can be alleviated to a large extent by the effective implementation of the Integrated Water Quality Management Strategy across the three Vaal WMAs. The Water Quality Management Strategy was developed in parallel to the Reconciliation Strategy and addresses salinity, eutrophication, microbiological pollution and institutional challenges.

Detail feedback on each of the management actions was presented and it was shown that although progress has been made in some areas, there are several interventions lacking behind schedule that is necessary to rectify the poor water quality in certain section of the river.

It was emphasised that the strategy needs to be implemented in an iterative fashion focusing on priority issues first.

2.6. Completion of the Vaal Comprehensive Reserve Determination Study

A Comprehensive Reserve Determination study has been carried out for the whole of the VRS and the conclusions of this study were:

- Providing Ecological Water Requirements (EWR) at the sites in terms of flow was not an issue. The poor water quality in sections of the river as well as too much flow with seasonal reversal was identified as the main negative impacts on the Vaal River;
- Current operation of the system is providing for the EWRs in most of the cases;
- Overall management of the system should be to solve the water quality problems;
- The analysed scenarios showed that major reduction in the available water in the Vals and Vet Rivers will occur if EWRs are implemented (further scenarios should be evaluated to achieve a sustainable balance in this tributary);
- Priority tributaries where no EWR has been determined should be identified and assessed;
- Monitoring should be implemented to assess the effect of the use of return flows, the implementation of transfers, further decanting of mines, water quality and further water use; and
- Implementation of the EWR is not going to solve the water quality problems and other ecological challenges on its own.

The SSC delegates were also informed of the process the DWA has initiated to classify the water resources in accordance with the Water Resources Classification System (WRCS), which was published in the Government Gazette in September 2010.

Three studies were commissioned for this purpose including the Olifants River, Vaal River (all three Water Management Areas) and the Olifants-Doring catchment in the Western Cape. The WRCS is a set of procedures for determining the class of water resources in accordance with the following three classes:

- Class I - minimally used and configuration of ecological categories of that water resource minimally altered from its pre-development condition;
- Class II - moderately used and configuration of ecological categories of that water resource moderately altered from its pre-development condition; and
- Class III - heavily used and configuration of ecological categories of that water resource significantly altered from its pre-development condition.

The current planning is that the classification of the water resources in the Vaal River System will be completed October 2012.

3. WATER BALANCE UPDATE AND REVISED RECONCILIATION SCENARIO

The system water balance and reconciliation scenarios were revised taking into consideration water use and return flows; revised water requirement and return flow scenarios; possible

transfers to the Crocodile West River System, mine effluent management scenarios as well as the eradication of unlawful irrigation water use.

The outcome of the target reconciliation scenarios is presented in **Figure 1** which shows that a positive water balance can be maintained until the year 2050 if all the strategy actions listed in **Section 1** are implemented.

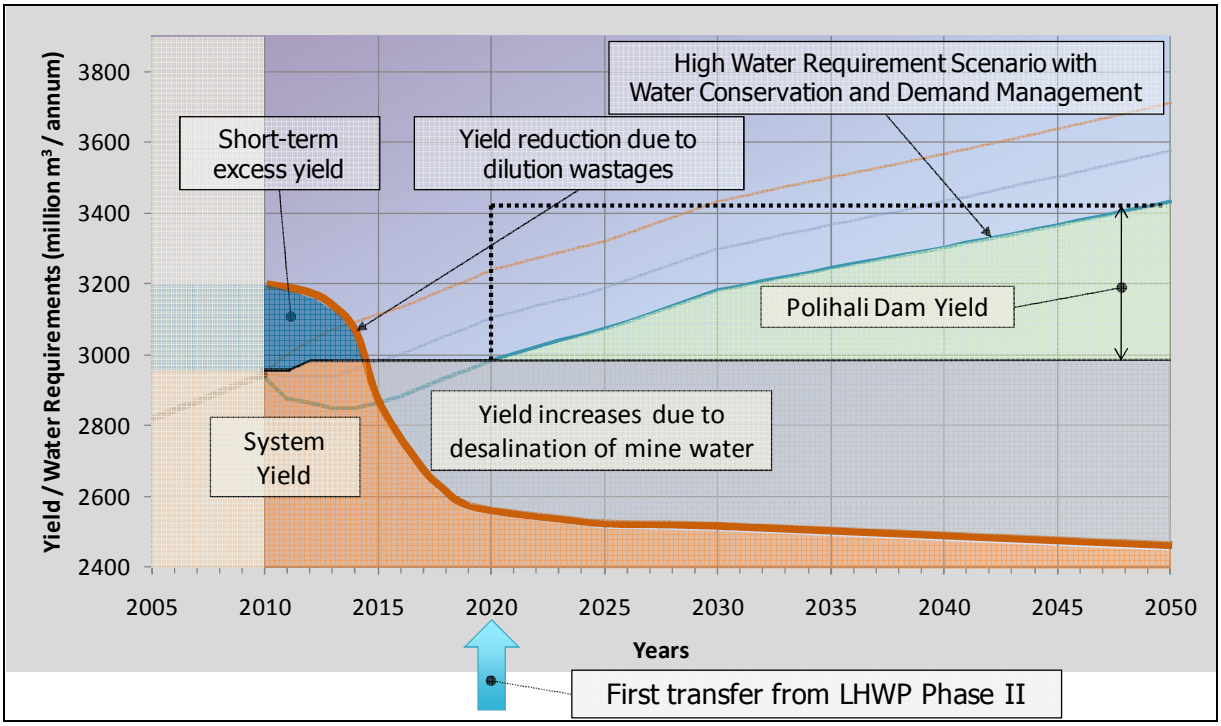

Figure 1: System water balance and target reconciliation scenario

Notes on Figure 1:

- Due to the high levels of the dams (May 2010) the system balance shows a short term excess for the first few years.
- The discharge of high salinity mine water will increase once the underground compartments filled and this will require large volumes of releases from Vaal Dam for dilution, which reduces the system yield due to excessive spills and wastage from Bloemhof Dam.
- Desalination and use of the mine effluent prevent these wastages and the system yield increases to about 3 000 million m^3/annum by the year 2014.
- The eradication of unlawful irrigation water use by 2013 and the savings through WC/WDM will maintain a positive water balance until the year 2020.
- The implementation of Phase II of the Lesotho Highlands Water Project (Polihali Dam and conveyance infrastructure) by 2020 will ensure sufficient water is available until the year 2049.
- The full yield of LHWP Phase 2 can only be transferred to the Vaal River System if a yield replacement scheme is developed in the Orange River catchment and commissioned by the year 2034.

There were certain uncertainties and risks identified that may influence the water balance which include the following:

- The water balance of the Crocodile West River system and the transfers required from the Vaal River System will dependant on the schedule of proposed projects in the Lephalale area.
- Failure to achieve the target WC/WDM savings or to eradicate the unlawful water use will result in shortage before Phase 2 of the LHWP can be implemented.
- The requirements for additional water to augment the Olifants River System may influence the water balance of the Crocodile West and/or Vaal River Systems. (A Reconciliation Strategy Study is currently been undertaken for the Olifants River System and the outcomes will be integrated with this strategy.)

4. GENERAL INFORMATION

Detail progress reports on the water resource management strategies can be found at the following link: www.dwa.gov.za/Projects/VaalWRMS/documents.aspx

The Study Manager for this project is Mr Seef Rademeyer, Chief Engineer at the Directorate: National Water Resource Planning (Central).

The next meeting of the Strategy Steering Committee is on 13 April 2011.