

ABSTRACT

South Africa is the darling of the platinum world with majority of the global platinum reserves being located in its backyard. Despite boasting extensive platinum mining activity, South Africa contrastingly has limited water resources. Additional pressure is placed on existing water resources due to climate change, poor water infrastructure and greater urbanisation. Hence water management in the mining sector, particularly the platinum mining sector is of great significance.

Platinum precious metal refineries are often neglected in terms of water related studies as they are comparatively smaller than other components involved in platinum production, such as platinum mines, hence the significance of this study as a means to increase awareness about platinum PMRs.

Accurate accounting of water usage in mining operations is necessary if water is to be effectively managed and minimised. Two water accounting methods were employed to evaluate water usage in a South African platinum precious metal refinery, namely the Water Accounting Framework and Water Footprint Network method. Flowrates and rainfall data were provided by the refinery, whilst evaporation data was obtained from the South African Department of Water and Sanitation. This information along with the appropriate assumptions was used to generate a comprehensive water account for the refinery.

The Water Accounting Framework found the volume of the total water inputs into the refinery to be 48.51 ML/year and the total volume of water outputs from the refinery is about 0.99 of the volume of the total inputs. The Water Footprint Network method found the total water footprint to be 49086.07 m³/year or 49.09 ML /year, comparable to the results of the Water Accounting Framework. The total water footprint was equivalent to the blue water footprint. The total product water footprint of the refinery being valued at 1.20 m³/kg PGM was found to be greater than that of base metal refineries.

After viable recommendations were taken into consideration the total product water footprint was reduced by 25%.