A reliable supply of fresh water is a critical component of coal fired power generation. During periods when water supplies are reduced, power generation may be limited, with obvious impacts on power consumers. Using the reconstructed historical streamflow series contained in the IQQM water allocation model, and simple water balance modelling, the water supply security of the Bayswater Power Station is assessed. The study revealed that the supply of water to the Bayswater Power Station is sensitive to extended dry periods, with some historical periods experiencing water shortfalls so severe that the station would be shut down without alternative water supplies.