An application of dynamic simulation for 16.2 MIGD MSF desalination plant

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ABSTRACT

For several decades, multiple stage flashing (MSF) has been the main stream in thermal seawater desalination process due to its stable and robust performance. In the Middle East region, MSF units of large capacity evaporators have generally been supplied. Meanwhile, the multiple effect desalination process with thermal vapor compression has recently been receiving attention because of the lower energy consumption. Dynamic simulation of thermal desalination plant could be used to validate plant operation before and after the plant design step. Also, it is expected to be helpful for understanding the dynamic behavior of processes under various conditions. For these reasons, we have developed the dynamic simulation model for MSF using GSE’s commercial package. The reference model is the Shuaibah IWPP MSF of 16.2 MIGD unit capacity (about 73,600 ton/day) in Saudi Arabia. The results showed that the simulation model was virtually stable at 100% load in summer condition with 5% deviations of designed values. In the dynamic simulation of start-up procedure, simulated trends were proven to be realistic based on real plant operation data. These results suggest that the dynamic simulation model could be applied for operator training and trouble shooting of operation procedures.

Keywords: Dynamic simulation; MSF; Cold start-up; Load change