The impact of sulphuric acid replacement by a phosphonate-based antiscalant on operational costs of seawater desalination

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\textbf{ABSTRACT}

The operation and maintenance of a seawater desalination plant have many challenges. One of the major challenges is to ensure the economic viability while complying with all the terms of the operation and maintenance contract, hence the constant quest for cost savings. One area for potential improvement is to rethink or optimize the use of chemicals and in particular the use of sulphuric acid. Sulphuric acid is used to lower the pH of feed water in order to reduce the risk of mineral precipitation on the reverse osmosis membranes. Simply eliminating sulphuric acid will result in a substantially higher operating pH and an associated increased risk of mineral precipitation. Managing this risk involves the injection of a properly selected high performance phosphonate-based threshold scale inhibitor. This article describes the details of a field trial in a two-pass seawater desalination plant during which sulphuric acid was phased out and replaced by a phosphonate-based antiscalant. The results show that the critical operating parameters remain stable, indicating the successful prevention of scale formation, throughout the trial period during which sulphuric acid was replaced by a phosphonate-based antiscalant. A holistic approach was used to understand the full impact of the replacement of sulphuric acid by a phosphonate-based threshold scale inhibitor on the operating costs of this seawater desalination facility.

\textit{Keywords:} Desalination; Operation and maintenance; Antiscalant; Sulphuric acid; Cost saving

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