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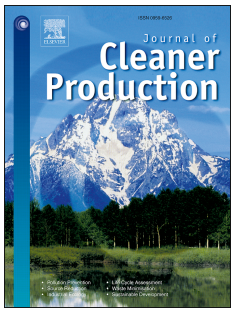

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Accounting for Central and Distributed Zero Liquid Discharge Options in Interplant Water Network Design

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Abstract

Brine and bittern waste streams are classified as a byproduct of seawater desalination operations, as well as many inorganic industries. As such, many of those industries are challenged to develop and implement sustainable, cost-effective strategies for managing water usage and wastewater discharge. As a result, zero liquid discharge goals have garnered a lot of interest for the purpose of enhancing strategies for wastewater handling. Zero liquid discharge may be achieved using a number of methods, including technologies through which industrial wastewater is reduced to dry solids/salts. This would mostly involve wastewater processing to brine water quality, using standard brine-producing wastewater treatment methods, followed by conventional zero liquid discharge techniques, which in turn transform brine wastewater to salts/bitterns. Salt sludge and bittern waste from zero liquid discharge processing have no adverse effects on the environment. Moreover, many techniques allow for the recovery of extra-purified water streams, as a result of wastewater-to-brine processing, and/or brine-to-salt processing. Recovered water streams may be directly reused, or even utilized to enhance the quality of other wastewater streams before reuse. Since compliance with stringent industrial wastewater regulations is through zero liquid discharge applications, this work discusses the incorporation of zero liquid discharge