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Wastewater minimization in multipurpose batch plants with a regeneration unit: multiple contaminants

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Abstract

Wastewater minimization can be achieved by employing water reuse opportunities. This paper presents a methodology to address the problem of wastewater minimization by extending the concept of water reuse to include a wastewater regenerator. The regenerator purifies wastewater to such a quality that it can be reused in other operations. This further increases water reuse opportunities in the plant, thereby significantly reducing freshwater demand and effluent generation. The mathematical model determines the optimum batch production schedule that achieves the minimum wastewater generation within the same framework. The model was applied to two case studies involving multiple contaminants and wastewater reductions of 19.2% and 26% were achieved.