

MANAGEMENT OF BEET SUGAR REFINERY PREHEAT TRAINS SUBJECT TO FOULING

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ABSTRACT

On a sugar beet refinery, raw sugar juice is preheated using a network of heat exchangers before entering a series of evaporators which concentrate it prior to crystallisation. These heat exchangers undergo severe fouling due to the crystallization of sulphates and carbonates present in raw sugar beet juice and wash water (Mwaba, 2003). The preheating is performed by recovering heat from crystallizer and evaporator vapours and condensates. This work describes mitigating fouling in the sugar refinery preheat train through scheduling of heat exchanger cleaning based on a heuristic algorithm described by Ishiyama et al. (2009). The objective is to minimise the use of a valuable heating utility stream by the judicious use of cleaning actions. A case study based on a British Sugar refinery, published by Smaïli et al. (1999), is revisited. The results are compared with those obtained by Smaïli et al. employing an MINLP/NLP formulation. Both approaches demonstrate the economic benefit and technical feasibility of fouling mitigation by manipulating cleaning.