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One of the common causes of premature tube failure in fired tube boilers - technically described as film boiling - is overheating of the tubes caused by steam blanketing. Current literature contains a significant amount of information on this problem, but not much in the way of definitive guidance for avoiding the problem. General ?rules of thumb? are available for identifying the heat flux limit required to avoid the problem as in Martens et al . Unfortunately, the values presented by different sources are often in disagreement.

This paper will look at a sulfur recovery unit (SRU) Claus waste heat boiler application and, through the use of Computational Fluid Dynamics (CFD), develop a means of predicting the conditions that lead to steam blanketing and resultant tube failure. Local heat flux conditions at gas side discontinuities (such as the tube inlet ceramic ferrule terminations) combined with associated local water side steam entrainment, and steam generation with coupled velocity effects are discussed.

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