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Steady State Modeling and Simulation of an Industrial Steam Boiler

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Abstract : Relap5 system code is one among powerful tools, which is used in the area of design and safety evaluation. This work aims to simulate the behavior of a radiant steam boiler at the steady-state conditions using Relap5 code system. To perform this study, a detailed Relap5 model is built including all the parts of the steam boiler. The control and regulation systems are also considered. To reproduce the most important parameters and phenomena with an acceptable accuracy and fidelity, a strong qualification work is undertaken concerning the facility nodalization. It consists of making a comparison between the code results and the plant available data in steady-state operation mode. Therefore, the model qualification results at the steady-state are in good agreement with the steam boiler experimental data. The steam boiler Relap5 model has proved satisfactory; and the model was capable of predicting the main thermal-hydraulic steady-state conditions of the steam boiler.

Keywords : industrial steam boiler, model qualification, natural circulation, relap5/mod3.2, steady state simulation
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