A Study on Hydraulic Resistance of Porous Media Approach for CANDU-6 Moderator Analysis

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Abstract

An adequate hydraulic resistance equation is derived from the empirical correlation of frictional pressure drop experiments {Hadaller, et al., 1996}. With implementing hydraulic resistance into the source terms of momentum equations, the better flow pattern and temperature distributions were predicted comparing to the experimental data obtained in the Stern Laboratories Inc. (SLI) in Hamilton, Ontario. The simulations are performed on two test cases; the nominal condition with a mass flow rate of 2.4 kg/s and heat load of 100 kW, and the low-flow condition with a mass flow rate of 2.18 kg/s and heat load of 100 kW. For the simulation, a three-dimensional CFD code, CFX-4 (AEA Technology), is used. The predicted flow pattern and temperature distribution agree well with the experimental measurements and the previous predictions performed by MODTURC_CLAS.