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# Two-Dimensional Modeling of Spent Nuclear Fuel Using FLUENT

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**Abstract :** In a nuclear reactor, an array of fuel rods containing stacked uranium dioxide pellets clad with zircalloy is the heat source for a thermodynamic cycle of energy conversion from heat to electricity. After fuel is used in a nuclear reactor, the assemblies are stored underwater in a spent nuclear fuel pool at the nuclear power plant while heat generation and radioactive decay rates decrease before it is placed in packages for dry storage or transportation. A computational model of a Boiling Water Reactor spent fuel assembly is modeled using FLUENT, the computational fluid dynamics package. Heat transfer simulations were performed on the two-dimensional 9x9 spent fuel assembly to predict the maximum cladding temperature for different input to the FLUENT model. Uncertainty quantification is used to predict the heat transfer and the maximum temperature profile inside the assembly.

**Keywords :** spent nuclear fuel, conduction, heat transfer, uncertainty quantification
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