

反应堆工程

## 基于多区非平衡模型的稳压器动态仿真与验证

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**摘要** 采用FORTRAN程序设计语言, 基于稳压器多区非平衡模型和吉尔数值求解方法, 开发了稳压器动态仿真程序NEP MR。计算结果与美国希平港核电站稳压器74 MW和105 MW甩负荷的试验结果进行对比, 总体趋势符合良好。NEP MR程序可较好地反映瞬态甩负荷过程中稳压器内部控制体的温度分层现象。在稳压器喷淋器开启和关闭瞬间, 汽相和液相控制体之间的界面流量出现突跳现象。计算结果证明了多区非平衡模型建模和NEP MR程序仿真的合理性。

**关键词** [稳压器](#) [多区非平衡模型](#) [动态仿真](#) [吉尔方法](#)

分类号

## Dynamic Simulation and Verification of Pressurizer Based on Nonequilibrium Multi-region Model

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**Abstract** A code (NEP MR) was developed for dynamic simulation of electrical heating pressurizer. Nonequilibrium multi region model was considered and Gear method was adopted for numerical solution. The calculation results were compared with the test results of transient loss of load from 74 MW and 105 MW for Shippingport Nuclear Power Plant in America, and the trend showed a good agreement. The NEP MR program can well reflect the thermal stratification phenomenon of control volumes in the pressurizer during transient loss of load process. At the moment of the pressurizer sprayer on and off, a flow rate jump phenomenon occurs at the interfaces between volumes of vapor and liquid phase. The computed results prove the applicability and accuracy of nonequilibrium multi region model and the program simulation.

### Key words

[pressurizer](#) [nonequilibrium](#) [multi-region](#) [model](#) [dynamic](#) [simulation](#) [Gear](#) [method](#)

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