原子能科学技术 2011 45 (5): 541-547 ISSN: 1000-6931 CN: 11-2044/TL

反应堆工程

AP1000冷管段小破口失水事故分析

杨江[1];田文喜[1];苏光辉[1,2];秋穗正[1,2]

1.西安交通大学动力工程多相流国家重点实验室，陕西西安710049 2.西安交通大学核科学与技术学院，陕西西安710049

收稿日期 修回日期 网络版发布日期:

摘要 基于压水堆最佳估算程序RELAP5/MOD3.4，对AP1000的冷却剂系统和非能动堆芯冷却系统进行建模分析，得到了系统压力、破口流量、燃料包壳温度等关键参数的瞬态变化，计算结果与西屋公司采用NOTRUMP程序计算的结果基本一致。分析表明：AP1000的非能动专设安全设施能有效地对一回路进行冷却和降压，防止堆芯过热，验证了AP1000发生冷管段小破口失水事故后的安全性。

关键词 AP1000 RELAP5 小破口失水事故

分类号

Analysis of Cold Leg Small Break LOCA for AP1000

YANG Jiang[1];TIAN Wen-xi[1];SU Guang-hui[1,2];QIU Sui-zheng[1,2]

1.State Key Laboratory of Multiphase Flow Power Engineering, Xi'an Jiaotong University, Xi'an 710049, China; 2.School of Nuclear Science and Technology, Xi'an Jiaotong University, Xi'an 710049, China

Abstract Based on the PWR best-estimate program RELAP5/MOD3.4, the reactor coolant system and the passive core cooling system of AP1000 were modeled and analyzed. Some key transient parameters were obtained, including RCS pressure, break discharge, cladding temperature, etc. The result is in close agreement with the result generated by NOTRUMP code from Westinghouse (USA). The calculation results show that safeguard system of AP1000 can effectively lower the temperature and reduce the pressure of the first loop, also can prevent core overheating. The safety of AP1000 during a small-break loss-of-coolant accident is verified.

Key words AP1000 RELAP5 small-break loss-of-coolant accident

DOI

通讯作者