

Development of a Computer Code for Thermal Hydraulic Analysis in a Reactor Vessel of APWR

Analytical Evaluation for Audit-Analysis = Unit 3 and 4 of Tsuruga Power Station (APWR) =

Features of APWR design
 • Adoption of a metal ring block type neutron reflector

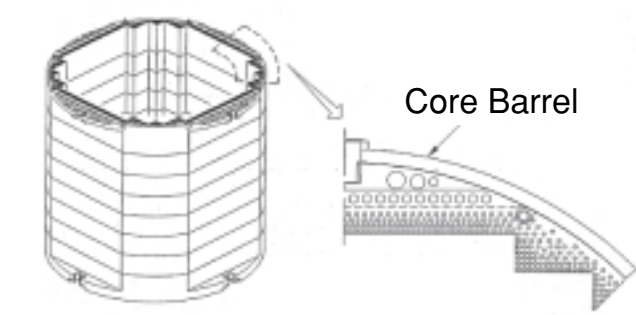
Gamma ray heat generation in the neutron reflector

Impact on thermal hydraulic behavior of reflooding at a large break LOCA

Sophistication of LOCA analysis
 Analysis using a new LOCA analysis code, TRAC

• Evaluation of thermal-hydraulic behavior, steam generation and reflooding velocity, etc. in a reactor vessel at a large break LOCA

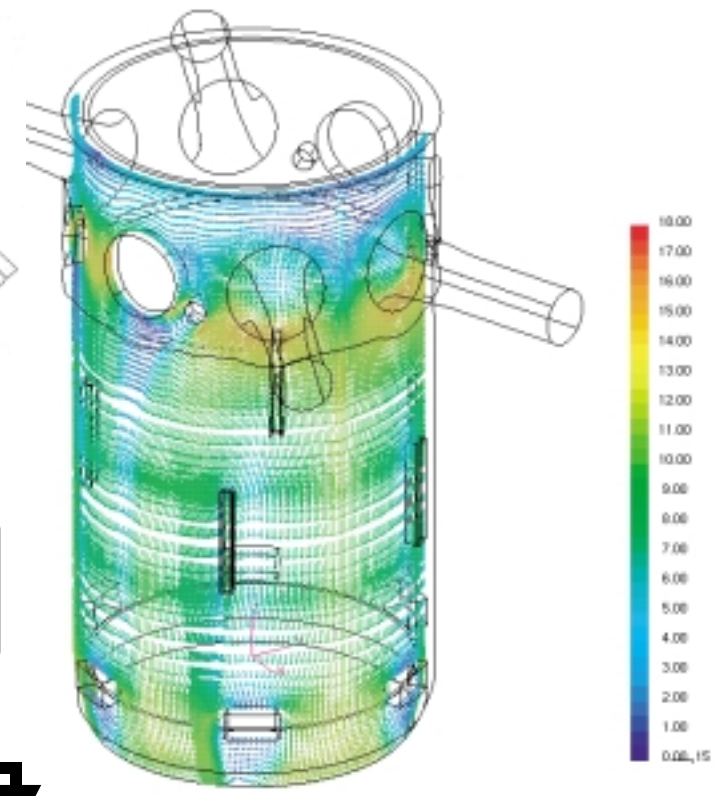
Main outcomes for fiscal year 2003
 • Evaluation of dominant factors affecting multi dimensional flows at a large break LOCA analysis of APWR



Structure of the neutron reflector

Improvement of neutron economy
 Simplification of reactor internal structure

Results of CFD thermal hydraulic analysis



Impact on thermal deformation of the neutron reflector

Introduction of computational fluid dynamics (CFD)
 Development of a computer code, u-FLOW/INS, for flow analysis in a core

• Evaluation of coolant flow distribution and coolability of the neutron reflector
 • Evaluation of temperature distribution of the neutron reflector

Main outcomes for fiscal year 2003
 • Confirmation of cooling characteristics of the neutron reflector.
 • Applicability of the computer code to the natural circulation analysis behind the neutron reflector.