

RELAP5™ Analysis

Overview

BWXT provides transient analysis using RELAP5™/MOD3.3 computer code. The RELAP5™ code has been extensively validated and developed to provide the best estimate prediction of thermal hydraulic systems normal operation and dynamic response. RELAP5™ was developed by Idaho National Labs and is recognized by the Nuclear Regulatory Commission (NRC) for the thermal-hydraulic analysis of transients in light-water nuclear power plants. It uses a one-dimensional, two-fluid model consisting of steam and water. BWXT has experience providing structural loads on Steam Generators (SG) and internal components using RELAP5™, as well as failure assessments for transient water level response and thermal fatigue in Heat Exchangers and piping systems.

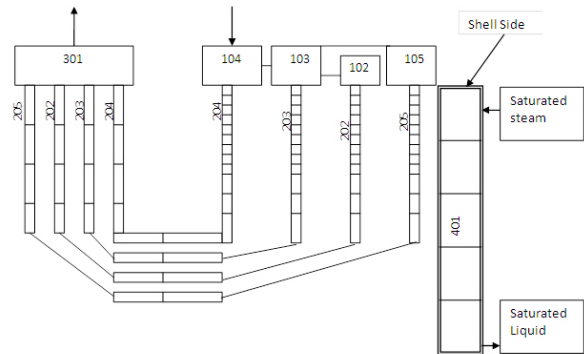
Applications

RELAP5™ is capable of modeling a wide variety of system configurations by linking its many generic component models, such as:

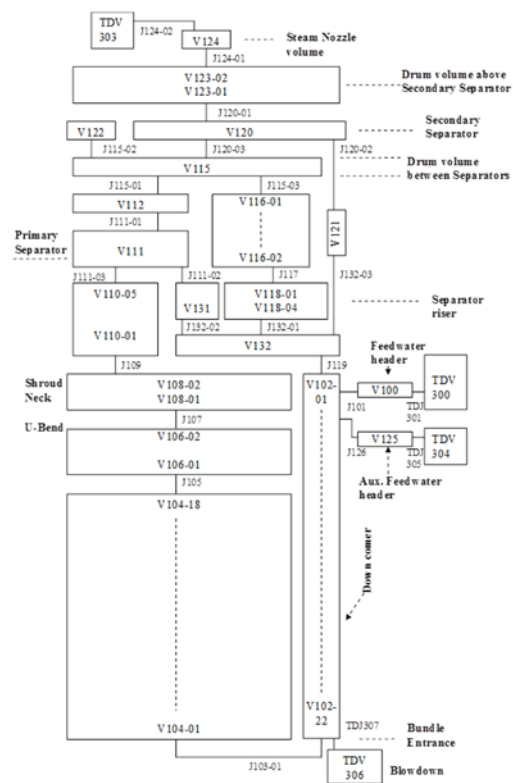
- Pumps Valves
- Pipes
- Heat releasing or heat absorbing structures
- Reactor point kinetics
- Electric heaters
- Jet pumps
- Turbines Separators
- Accumulators
- Controls system components

RELAP5™ can model a wide range of transient conditions, including transient water level control, small and large pipe breaks, loss of feedwater, loss of offsite power, and station blackout.

Due to its flexibility and generic structure, RELAP5™ can be also be used to model transients in balance of plant (BOP) and non-nuclear systems.



Bleed Condenser Model

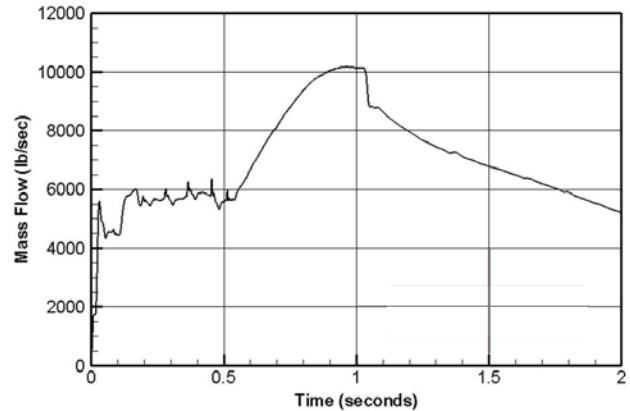


Recirculating Steam Generator model nodalization

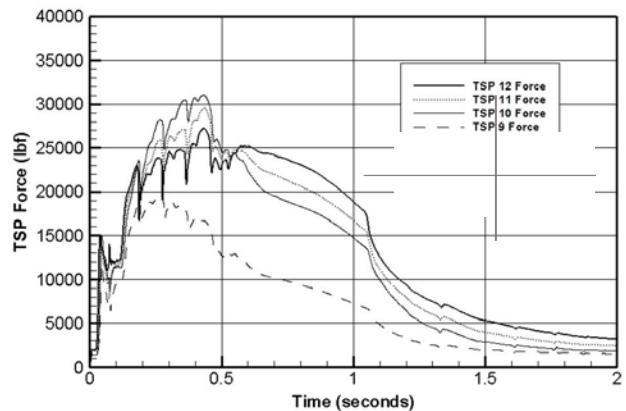
Capability and Tools

BWXT has used RELAP5™ for a range of analyses including:

- Analysis of internal loads on steam generator components during a LOCA event
- Analysis of internal loads on steam generator components during main steam line and main feedwater line breaks
- Transient analysis of steam generator water level during a turbine trip
- Analysis of natural recirculation in the tube side of a multi-pass vertical heat exchanger during standby



Mass flow due to a rapid transient



Force on internal components due to a rapid transient

NUCLEAR ENERGY

GOVERNMENT SERVICES

ADVANCED TECHNOLOGIES

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