

TYPICAL USES:

ANALYSIS

- Simulation.
- Performance assessment.
- Modification assessment.
- Fault root cause assessment.

DESIGN

- System sizing.
- Component sizing.
- Determining operating ranges.
- Flow, temperature, pressure, power consumption, etc.
- Testing of control philosophy.

TRAINING

- System behavior examination.
- Performing basic flow and heat transfer calculations.
- Thermohydraulic principles and properties referencing.

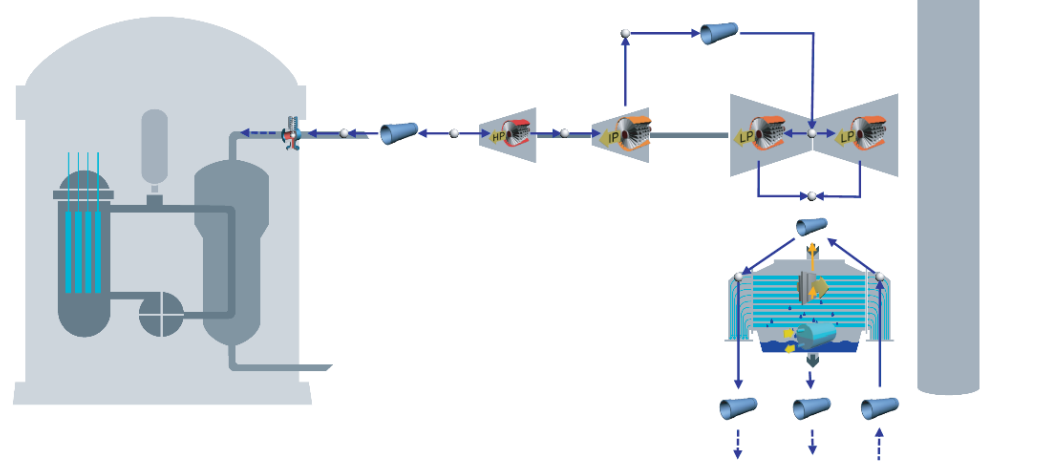


Flownex SE enables system level modelling of nuclear plant fluid mechanics, heat transfer and neutronic response in both transient and steady state.

NUCLEAR VERIFICATION AND VALIDATION

A rigorous V&V process is followed in the development of those Flownex® components relevant to the nuclear industry. These cases are captured in Flownex's Verification and Validation pack which ensures their integrity for use in nuclear safety related applications.

FLOWNEX®
LICENSE
HOLDERS



ENGIN
SOFT

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CYCLE DESIGN
& ANALYSIS

PLANT RESPONSE
OPTIMIZATION

ACCIDENT SCENARIO
EVALUATION

**BRINGING NUCLEAR
QUALITY AND STANDARDS
TO SYSTEM SIMULATION**

Flownex® is developed in an ISO 9001:2015 quality assurance system and NQA1 supplier approved environment.



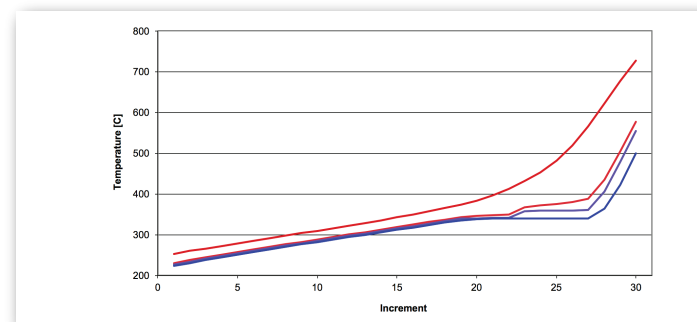
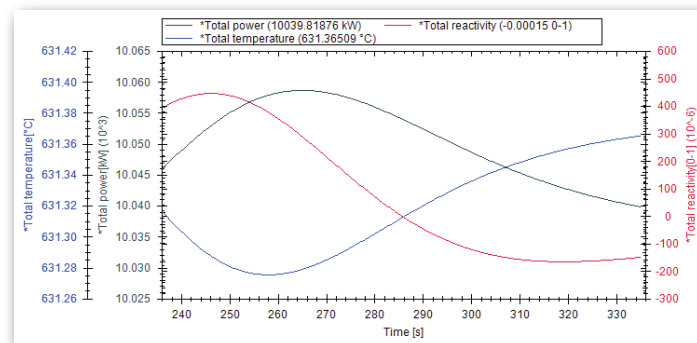
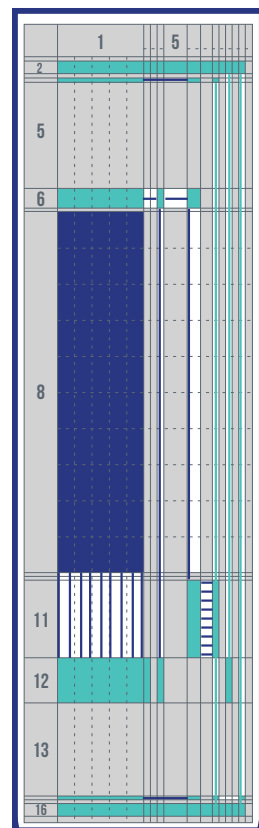
www.flownex.com +27 18 297 0326/7 enquire@flownex.com

REACTOR MODEL

Integrated calculation of neutronic heat generation and pressure drop.

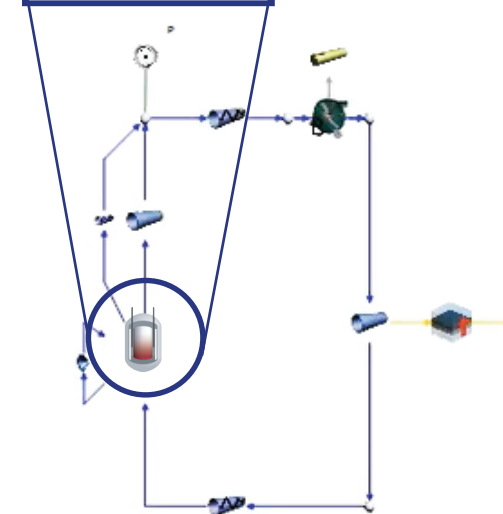
- HTGR, PWR, MSR.
- Custom Specified reactor geometry.
- Vast selection of fluids and solid materials.
- Fuel moderator and coolant heat transfer and temperature results.

- Active
- Passive heat removal design.
- Neutronic specification options:
 - Built-in poin kinetics.
 - C# user defined scripting.
 - External software co-simulation.



Engineering productivity for the design and analysis of complex thermofluid systems such as those found in large power plants is vastly improved by modeling in Flownex®. In addition, the system knowledge and understanding gained by the modeller is invaluable in subsequent activities.

Gary de Klerk, Pr. Eng
Chief Engineer, Plant engineer
Turbine Process Group Technology
ESKOM



CYCLE & AUXILIARY SYSTEMS

BOILER STEAM SYSTEMS

- Once-through and reheat boilers.
- Temperature calculation and change rates.
- Boiling stability & boiling regime examination.
- Detection of boiling oscillations (Ledinegg, density wave, pressure drop-type)
- Recirculation rate and steam production.
- Natural circulation boiler.
- Attenuation system.
- Dry out prediction.
- Load changes.

GAS & STEAM TURBINES

- Start-up, shut-down and load following operation.
- Turbine trip control.
- Gland steam systems.
- Lubrication systems.

HEAT EXCHANGERS

- Integrated heat exchanger components.
- Detailed heat tranfer components.
- User defined fluids as well as pressure drop and heat transfer correlations.

FLOW CIRCUITS

- Pipeline, valve and pump sizing.
- Water hammer.
- Cooling tower response.
- Heat exchanger sizing.
- Water reticulation flow balancing & energy efficiency.

CONTROL PHILOSOPHY DEVELOPMENT

- Integrated plant transient response.
- Built-in DCS library.
- C# user scripting.
- MatLab/Simulink coupling.
- OPC coupling.

CONDENSERS

- Wet and dry condenser heat exchange.
- Condenser level following.
- Air leak detection.

SAFETY ANALYSIS

- Relief valve sizing
- Passive heat removal analyses:
 - Natural circulation
 - Radiative heat transfer
 - Conjugate heat transfer

ACCIDENT ANALYSES

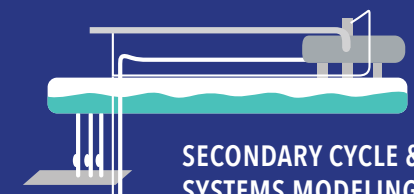
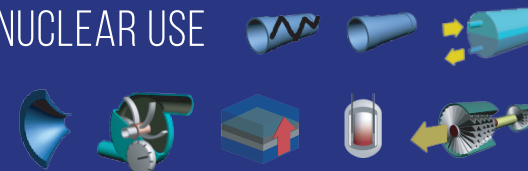
Calculate temperatures, leak rates, pressure waves (water hammer) and pipe support loads for:

- Loss of Cooling Accident (LOCA)
- Pump trip
- Tube break in Steam Generator

RESEARCH OR MATERIALS TEST REACTORS

- Calculation of core flow and temperature distribution.
- Calculation of irradiation loop cooling and flow requirements.

SOME FLOWNEX COMPONENTS FOR NUCLEAR USE



SECONDARY CYCLE & AUXILIARY SYSTEMS MODELING