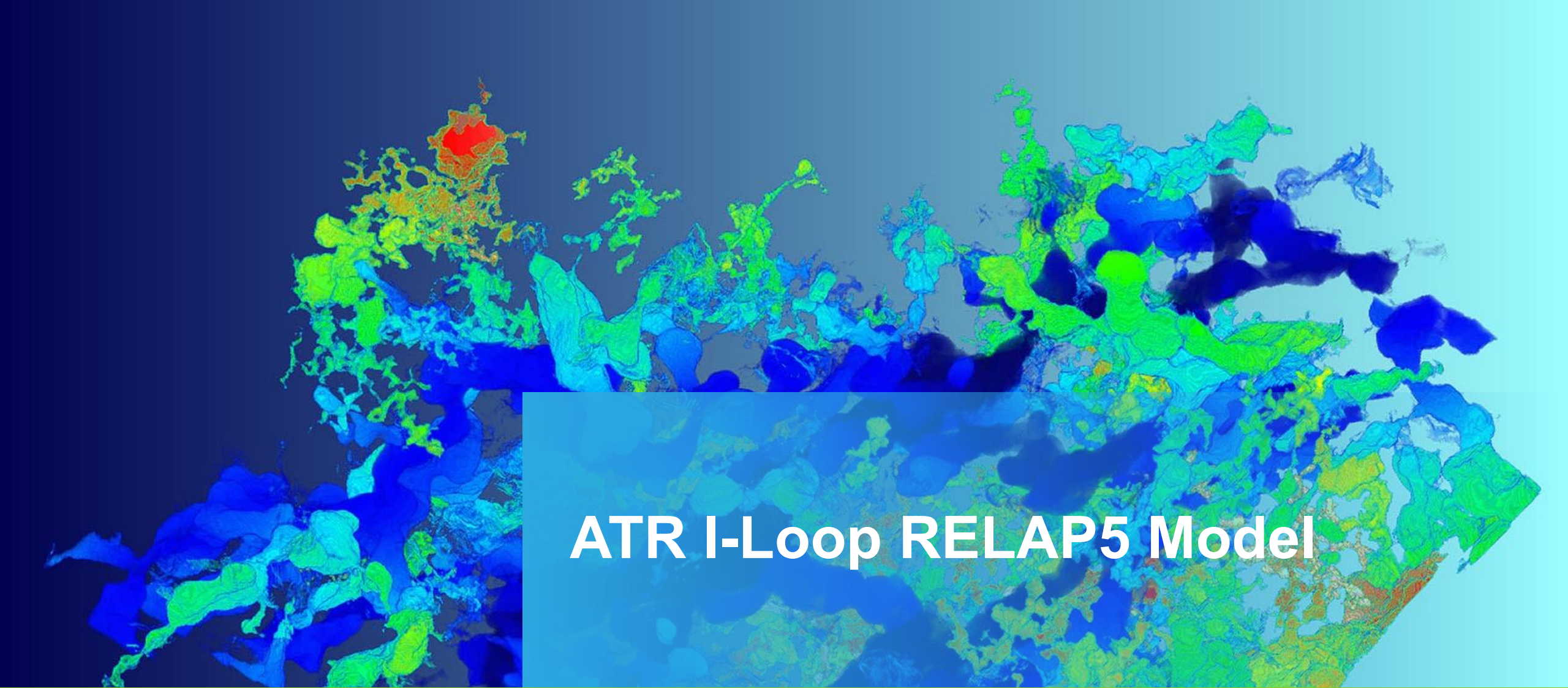




ATR I-Loop RELAP5 Model

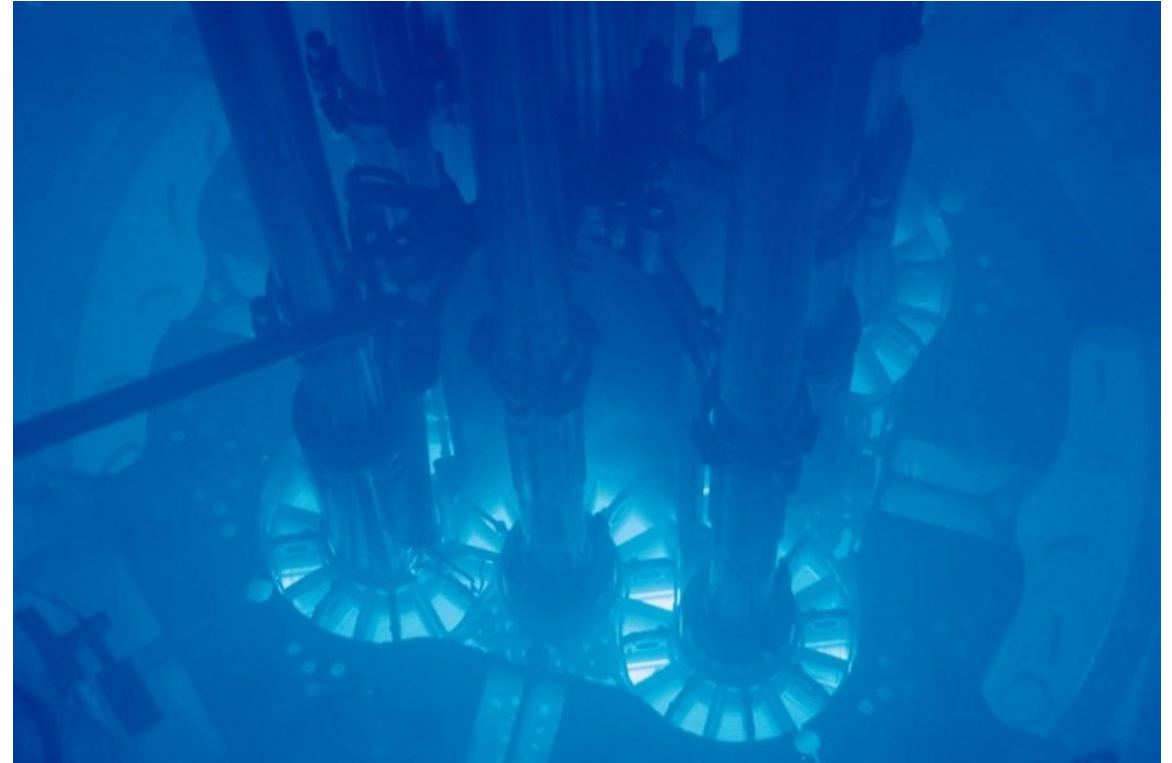
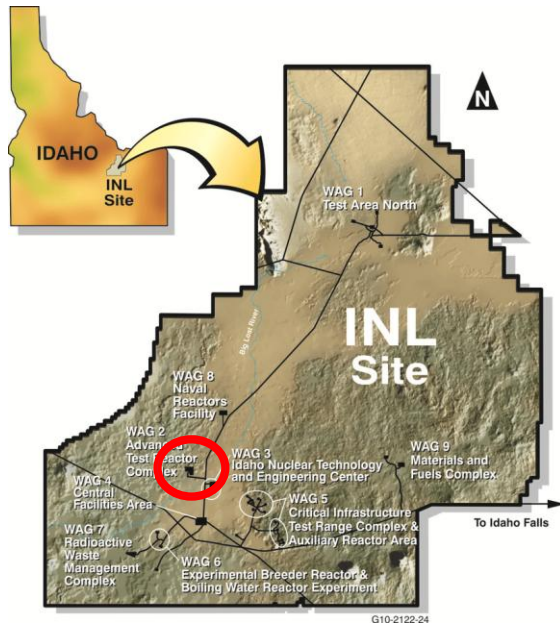
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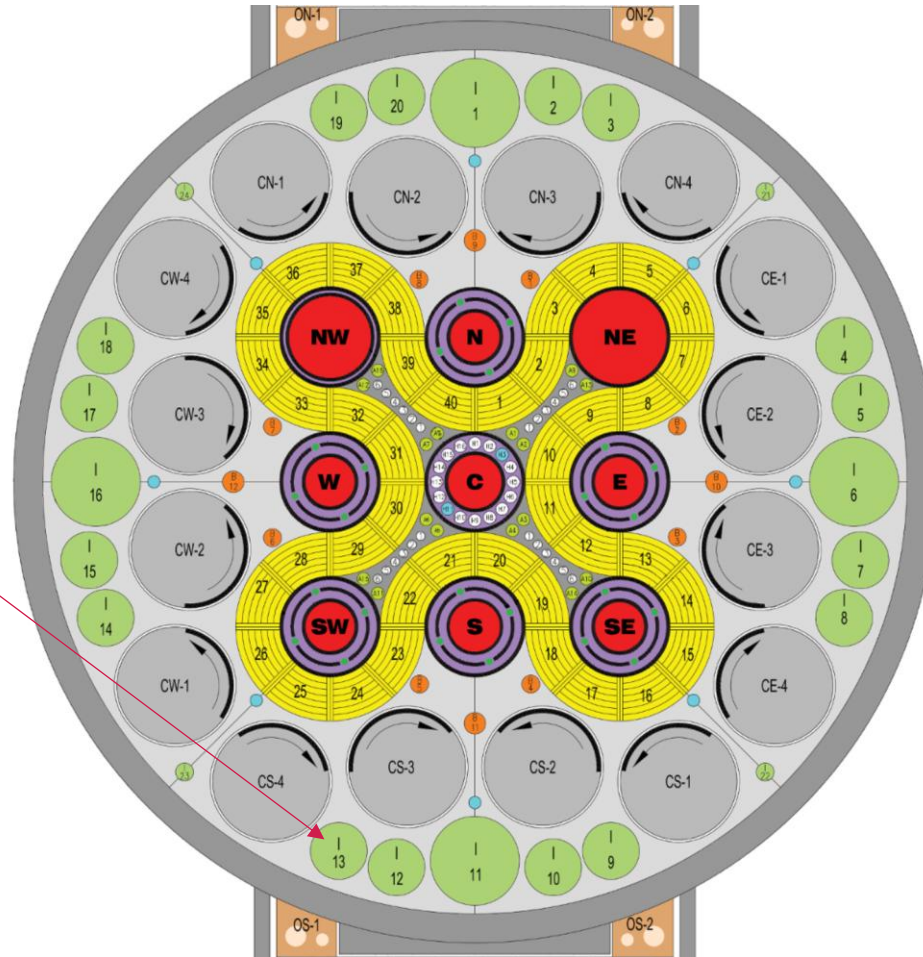
Advanced Test Reactor (ATR)

- Test reactor used to perform irradiation experiments.
- Operated by the Idaho National Lab.
- Located in the Arco Desert in Idaho.



ATR layout, I-Loop position and purpose

Proposed I-Loop
Position in ATR (I13)



The purpose of the I-loop is to provide a test platform that is isolated from the reactor primary coolant but can still run irradiation experiments.

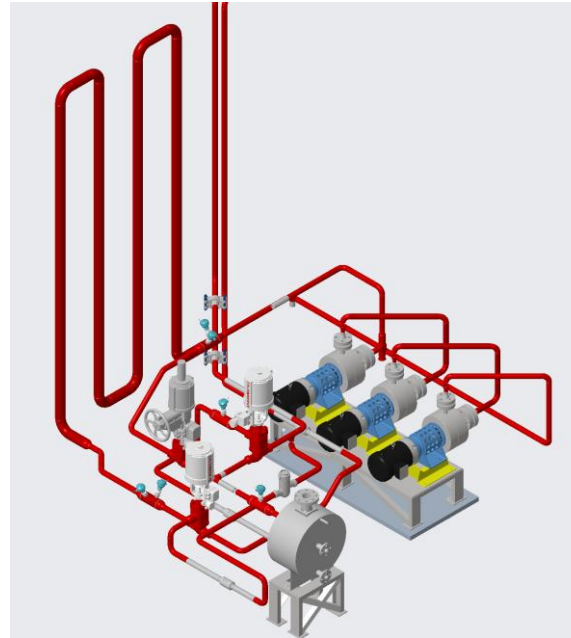
I-Loop Overview

Ex-core System

- 3 – 7-1/2 HP Pumps (2-active 1-windmilling)
- Pressurizer
- Heat Exchanger
- Flow and Temperature Control Valves

In-core Components

- Fueled assemblies
- Nested tubing sections for flow reversal
- Instrumented capsules



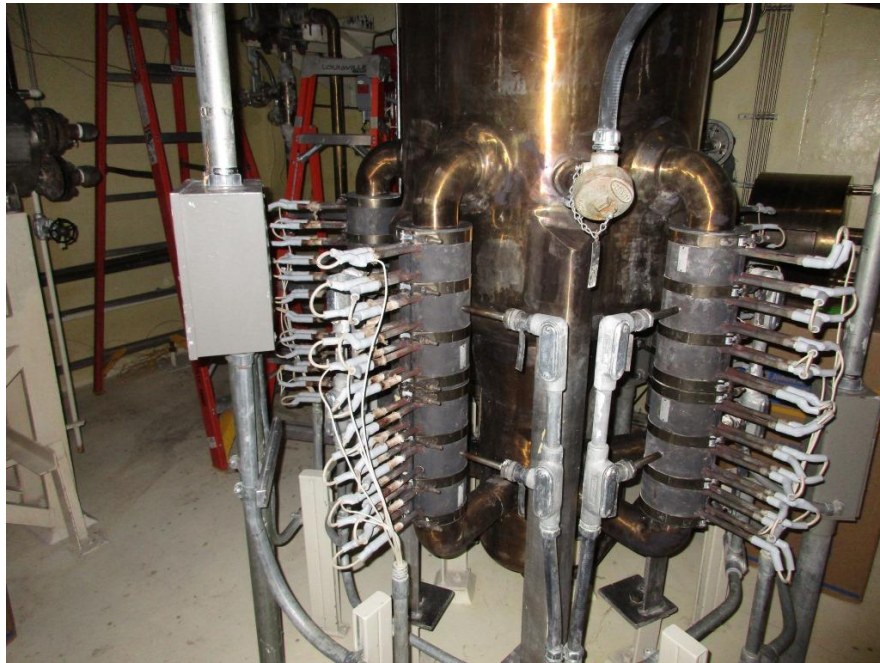
Ex-core I-Loop Configuration in ATR Cubicle



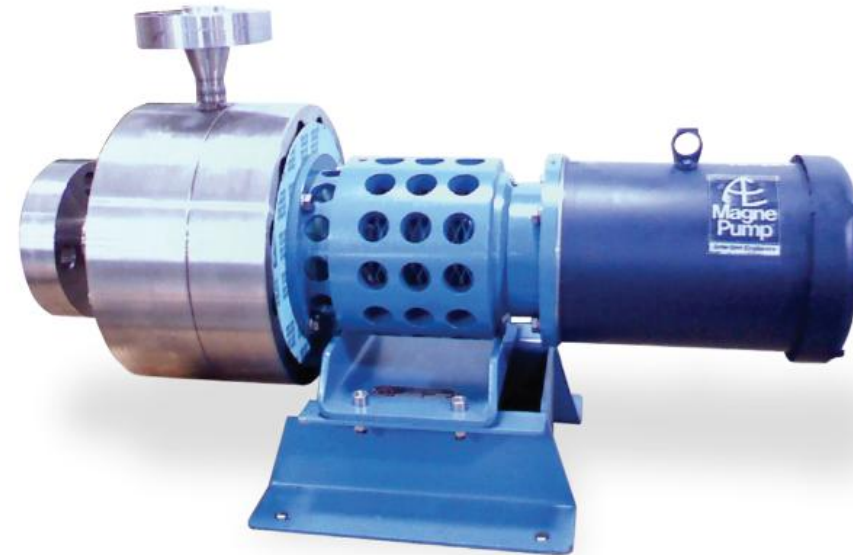
In-core I-Loop Configuration

I-Loop System Components

Pressurizer with heaters

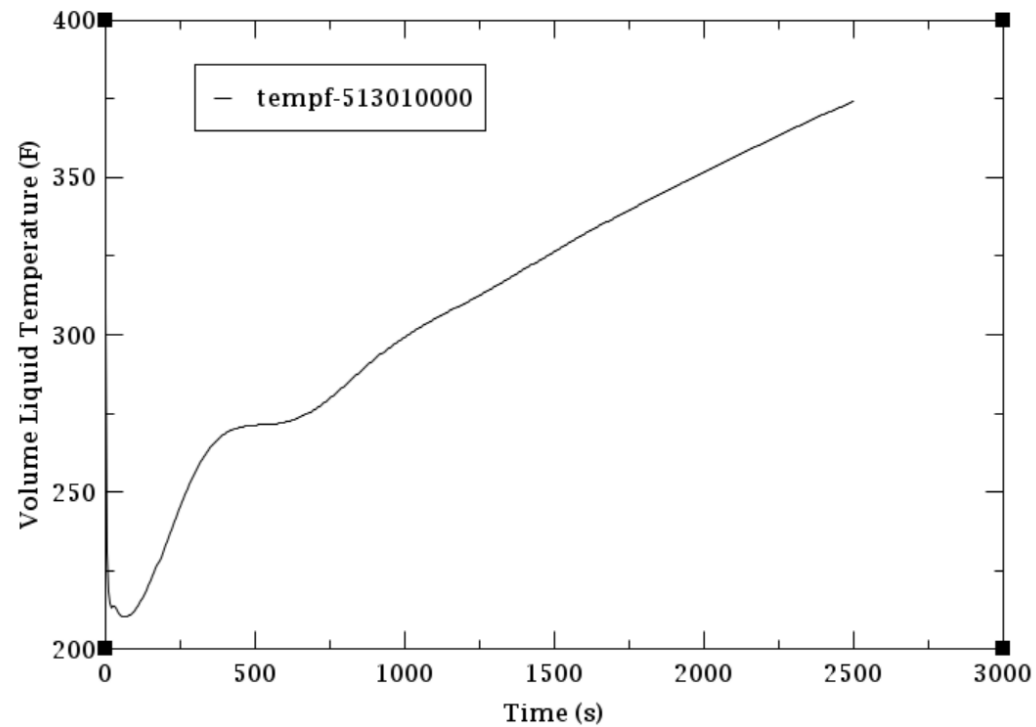


Pump assembly

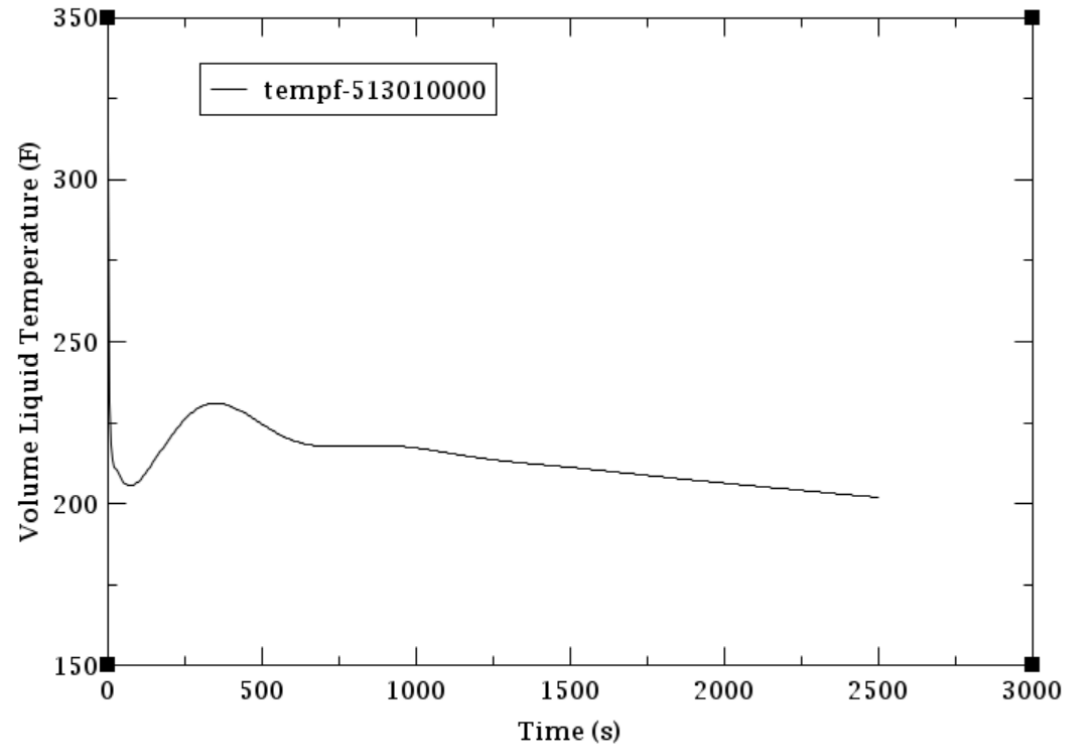


Status of Loop Model – Component Sizing

Loop heater effect on inlet temperature



Parasitic heat loss from insulated pipe and cubicle cooler and reactor coolant



Deliverables from RELAP5 Model

Key Model Deliverables

- Consistent inlet temperature for experiments during ATR cycles
- Temperature correction using heat exchanger bypass during ATR cycles
- Pressure drop for pump sizing
- Response of the system and experiment during transients (Large-break and small-break LOCA, RIA, LCP)
- Heater and heat exchanger sizing for temperature control at the inlet
- Insulation sizing for temperature control and inlet temp prescription at multiple flow rates.
- Cooler sizing for temperature control of the cubicle



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