

# Test Program Overview



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# Background

NuScale test programs will support

- codes and methods development and V&V.
- refueling operation development and optimization.
- structures, systems, and component design and validation.
- ASME code case development or application basis.
- fabrication process development.
- equipment qualification.

These tests consist of various scaled and prototypic, integral and separate effects programs.

# Testing for Safety and Operation

## Full System Safety Tests

### Fabricating and Testing Major Components

- Steam Generator
- Handling Equipment
- Control Rod Drive Mechanisms
- Passive Safety Systems
- Valves
- Inspection Equipment
- Fuel Bundles
- Main Control Room

### Separate Effect Tests

- Fuel Assembly Flow Testing
- Fuel Grid Structural Crush Testing
- Fuel Rod Critical Heat Flux Testing
- Containment High Pressure Condensation
- Steam Generator Heat Transfer Testing



# NUSCALE INTEGRAL TEST FACILITY

## Scaled Integrated Reactor Facility

1:3 Height and Length scale

1:254.7 Volume scale

Prototypic Pressures - Temperatures

Reactor Vessel

Two Reactor Vent Valves (RVV)

Two Reactor Recirculation Valves (RRV)

Helical Coil Steam Generator

Pressurizer

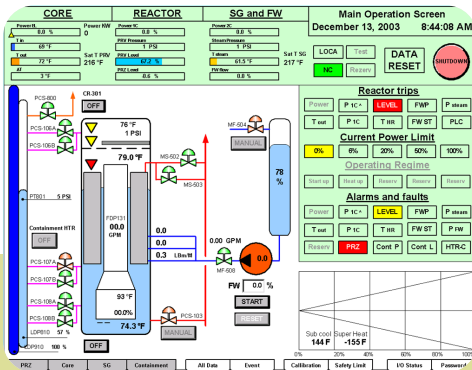
Electric Core Bundle Simulator

Containment

Cooling Pool

## V&V Data Acquisition System (DAS)

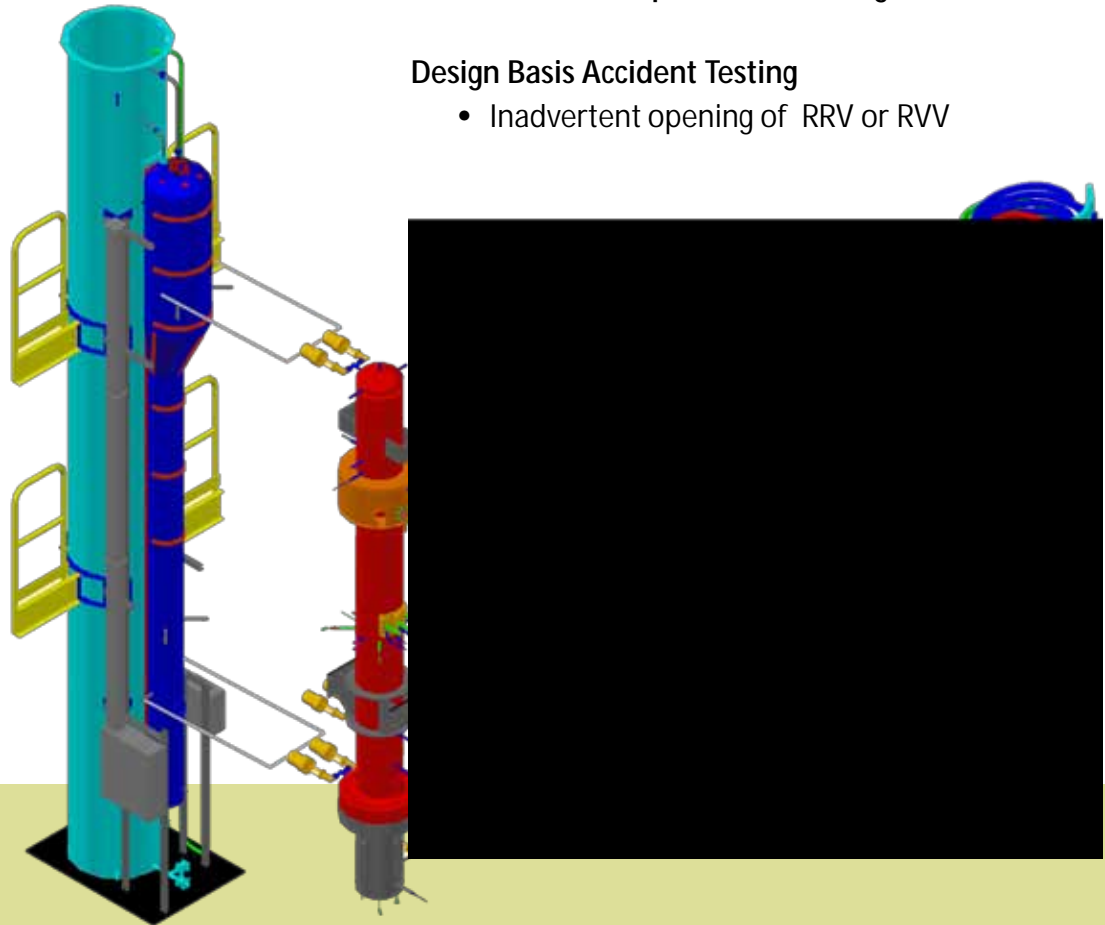
## Facility Control System



## Shakedown and Operational Testing

## Design Basis Accident Testing

- Inadvertent opening of RRV or RVV





# NuScale Integral System Test Facility

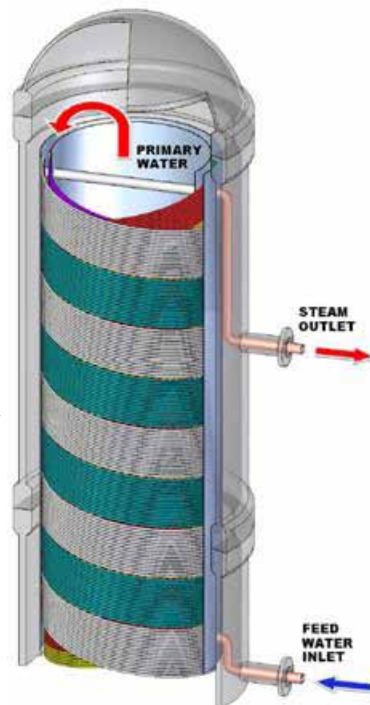
- QA Program in place at OSU
- Test Facility Scaling Methodology sent to NRC - 12/10
- IAEA international standard problem test in 2011
- Currently defining DCA Test Matrix



# SIET-NuScale Helical Coil SG



GEST test facility at SIET, reproduced with permission



- Thermal performance tests
- Low power flow stability tests
- DHR testing
- FW/SG controls assessment

People

# Issues

- The value and effectiveness of test programs would benefit from NRC feedback on
  - test program basis, scope, objectives, and timing.
  - test specifications, requirements, and outcomes.
- Near term DCA submittal date requires NRC Pre-Application feedback on scaling, PIRT, and planned certification test matrix.

# Pre-Application Outcomes

- Timely feedback from NRC on NuScale test plan scope and objectives
- Determine NRC engagement during various test programs



# Pre-Application Engagement

- Presentation and feedback on scaling methodology topical report
- NuScale presentation describing details of overall test plan and schedule