Overview of NuScale Technology

D. T. Ingersoll
Director of Research Collaborations

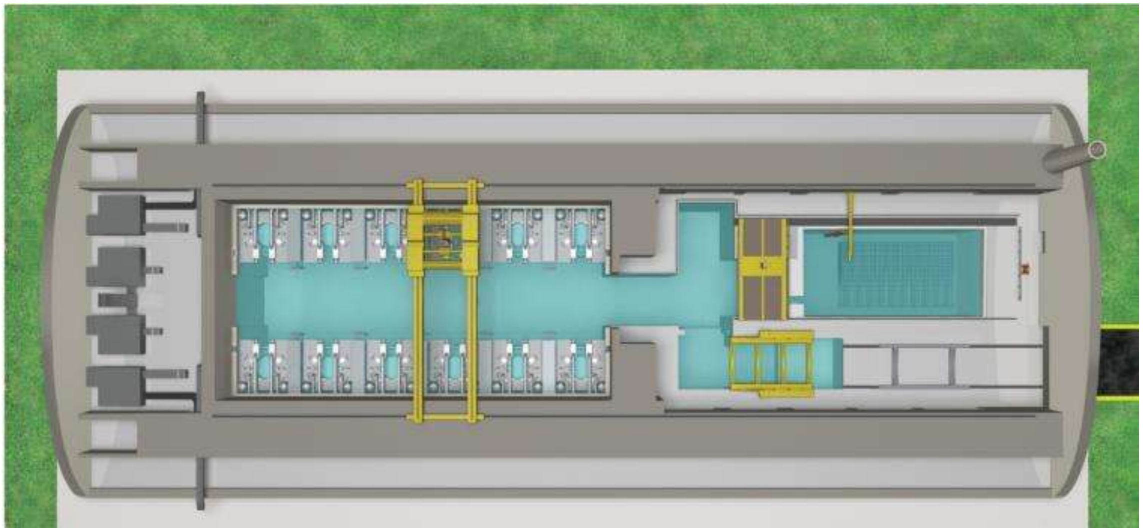
June 12, 2012

33rd Annual CNS Conference

Deliberately Small for Safety and Affordability

KEY: Scalable plant design based on robust 45 MWe module

- Integral PWR design with natural circulation of primary coolant
- Steel containment vessel immersed in 4 million gallon pool
- Factory fabricated and truck transportable to site
- Staggered build-out to match demand growth and reduce cash outlay

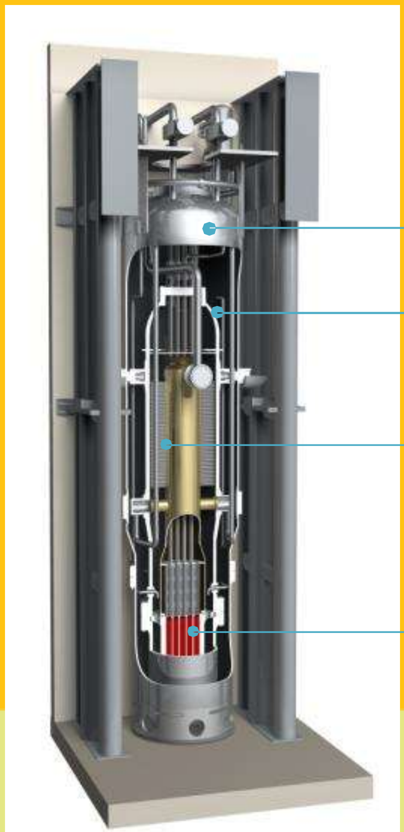


540 MWe "12 Pack" Reference Plant

45 MWe Module

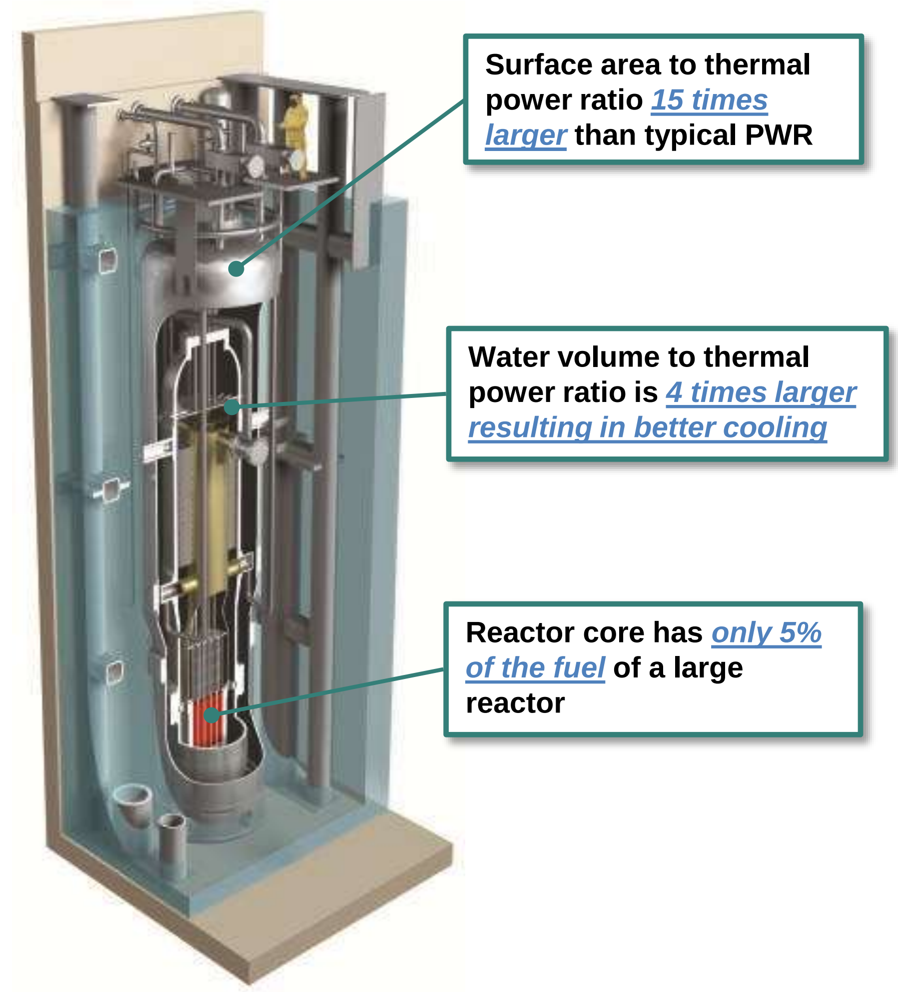
NuScale Power™

NuScale Module: NSSS and Containment



Passively Safe and Robust Modules

- **Natural Convection for Cooling**
  - Inherently safe natural circulation of water driven by gravity cools the nuclear fuel
  - No pumps required to continuously provide water for safety functions
- **Seismically Robust**
  - System is submerged in a pool of water below ground in an earthquake resistant building
  - Reactor pool attenuates ground motion and dissipates energy
- **Defense-in-Depth**
  - Multiple additional barriers to protect against the release of radiation to the environment

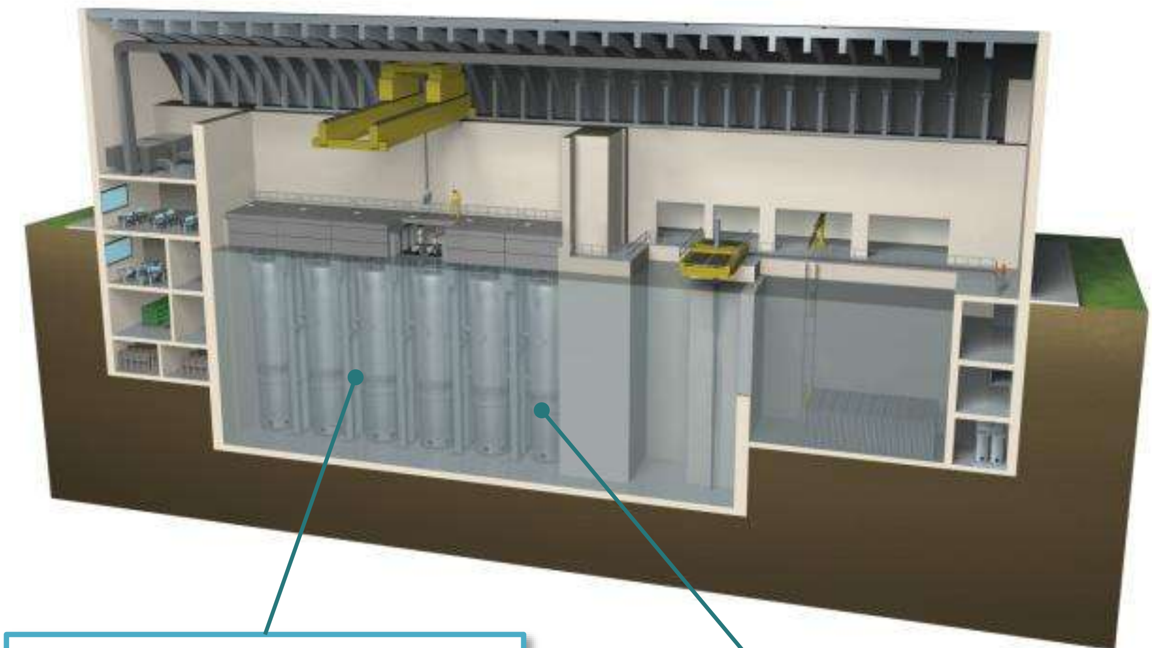


Modules in Robust Reactor Building and Pool

NuScale nuclear power reactors are housed inside ***high strength (10x) steel containment vessels*** and submerged in 4 million gallons of water below ground level inside the Reactor Building.

The Reactor Building is ***designed to withstand earthquakes, floods, tornados, hurricane force winds, and aircraft impacts.***

12-module, 540 MWe NuScale Plant

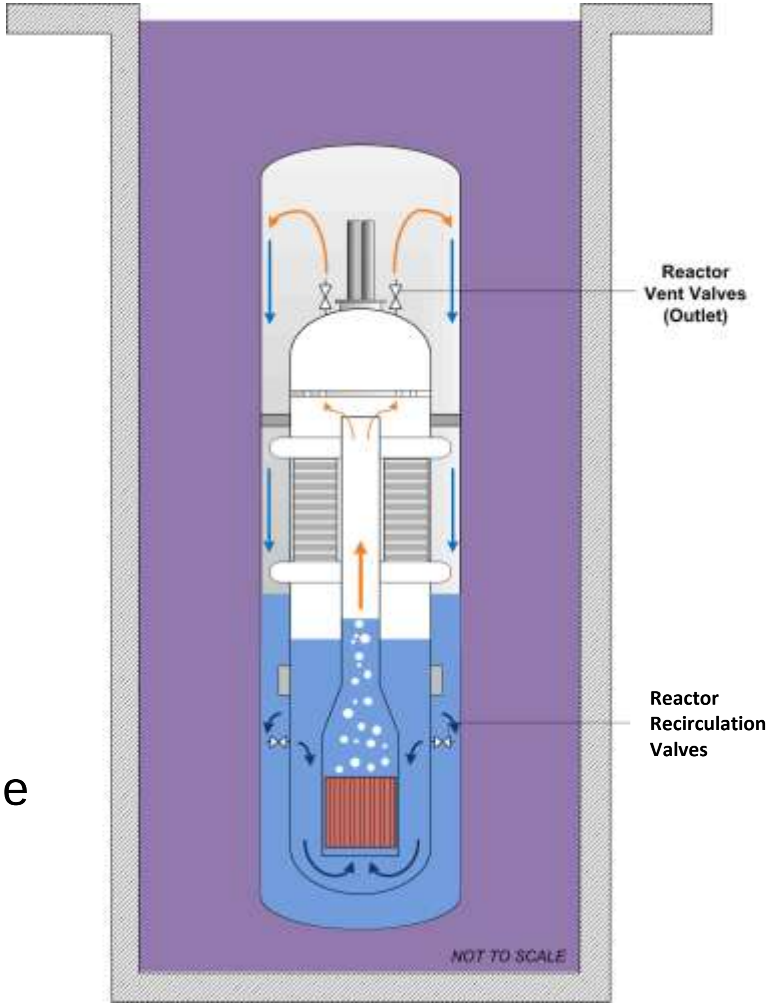


Reactor pool sufficiently large to provide all modules with 30-day supply of cooling water.

Any hydrogen released is trapped in containment vessel with little or no oxygen available to create a combustible mixture.

Decay Heat Removal From Containment

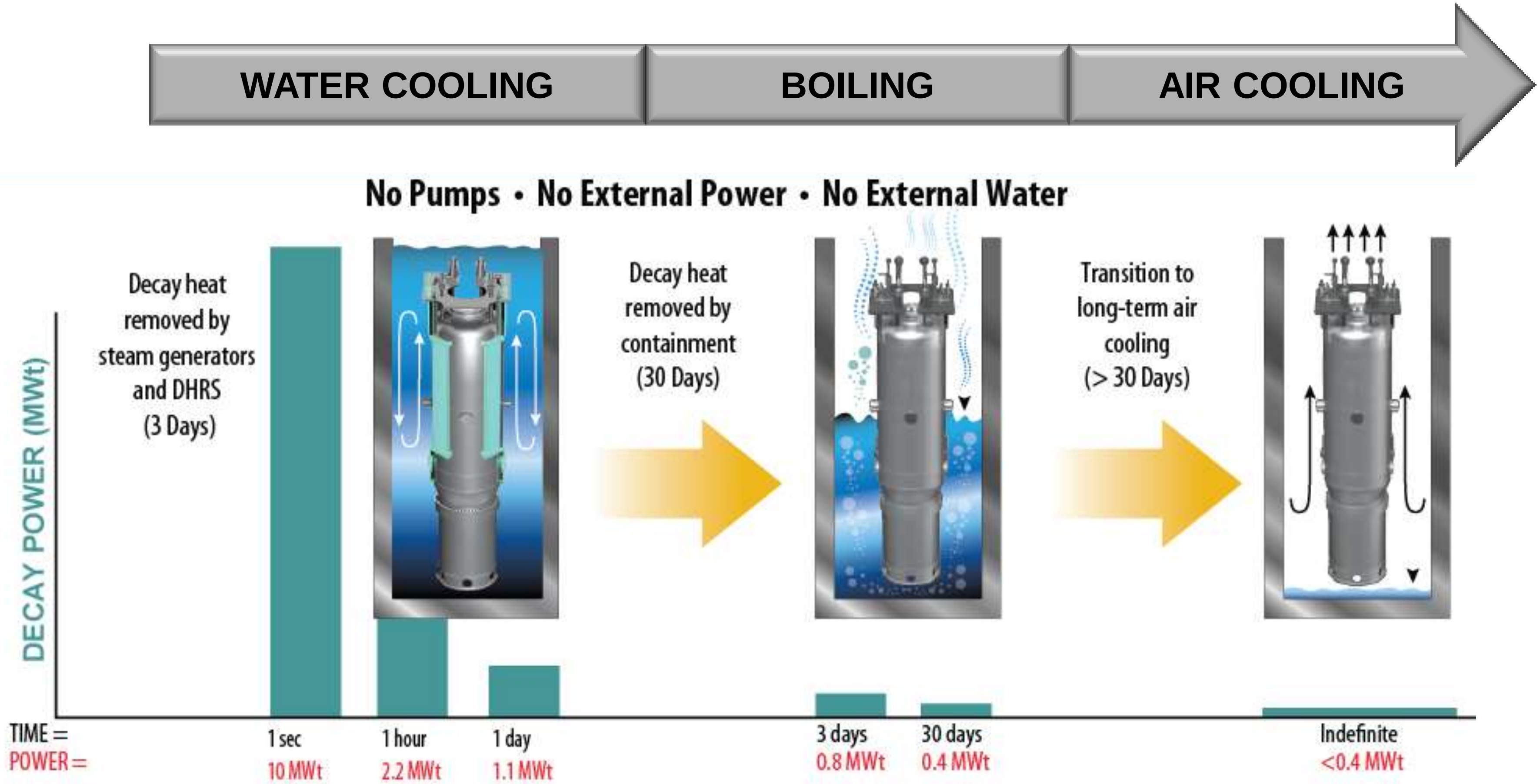
- Provides a means of removing core decay heat and limits containment pressure by:
  - Steam Condensation
  - Convective Heat Transfer
  - Heat Conduction
  - Sump Recirculation
- Reactor Vessel steam is vented through the reactor vent valves (flow limited)
- Steam condenses on containment
- Condensate collects in lower containment region
- Reactor Recirculation Valves open to provide recirculation path through the core
- Provides 30+ day cooling followed by indefinite period of air cooling.



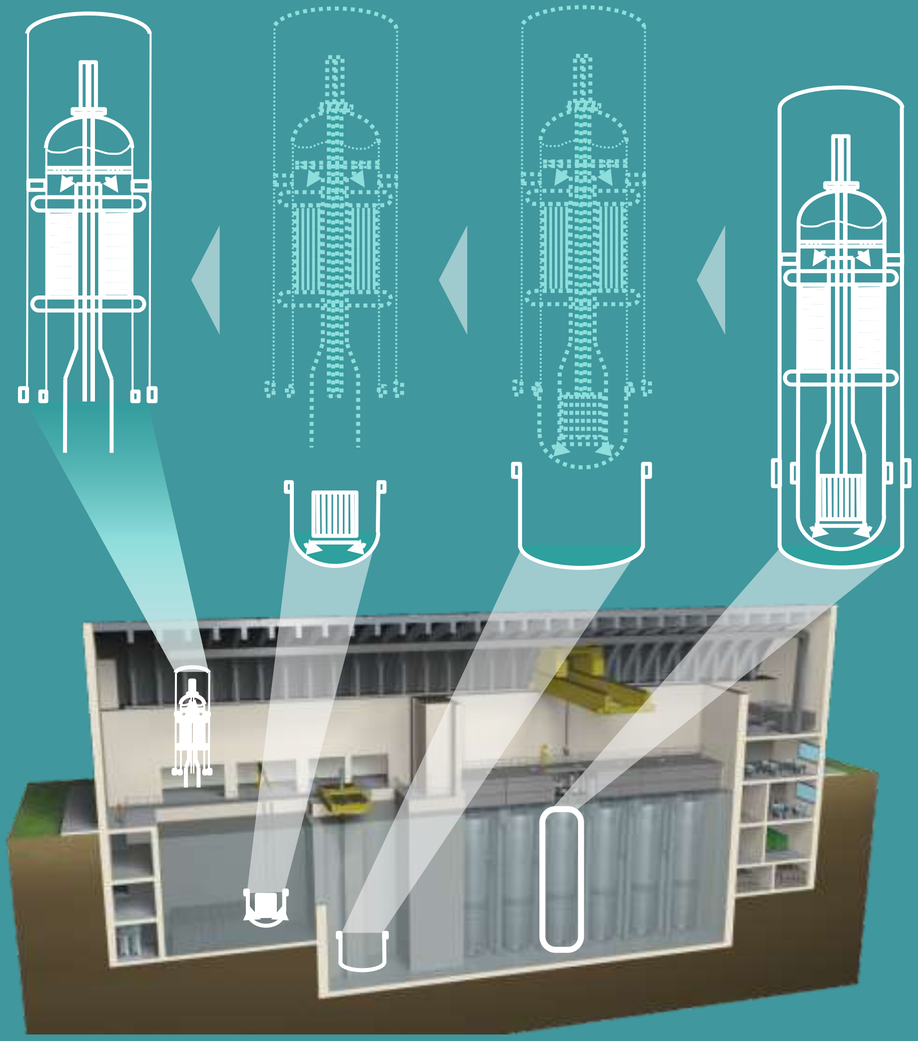
NuScale Power™

Stable Long Term Cooling

Reactor and nuclear fuel cooled indefinitely without pumps or power



Module Assembly Operations

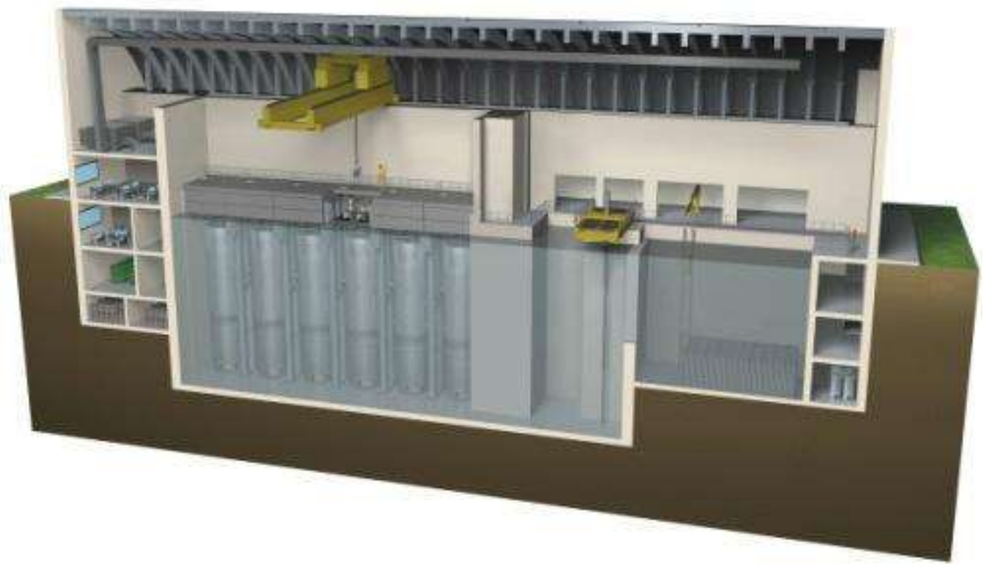


NuScale Power™

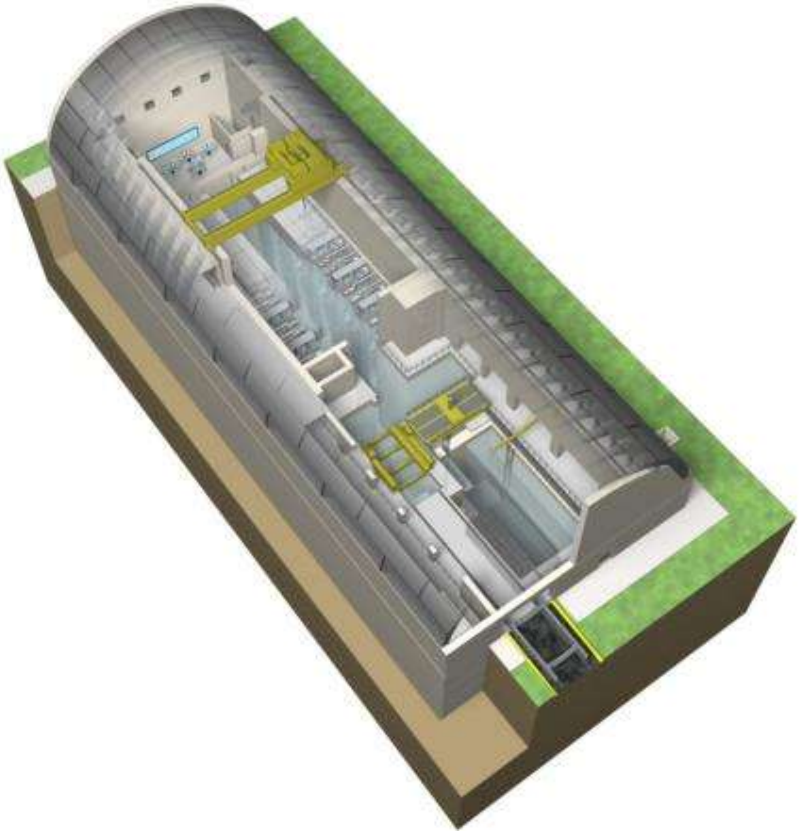
Modularity Is Key to Scalability

Reference Plant: 12 modules @ 45 MWe each produces 540 MWe

Allows for staggered installation and refueling of modules

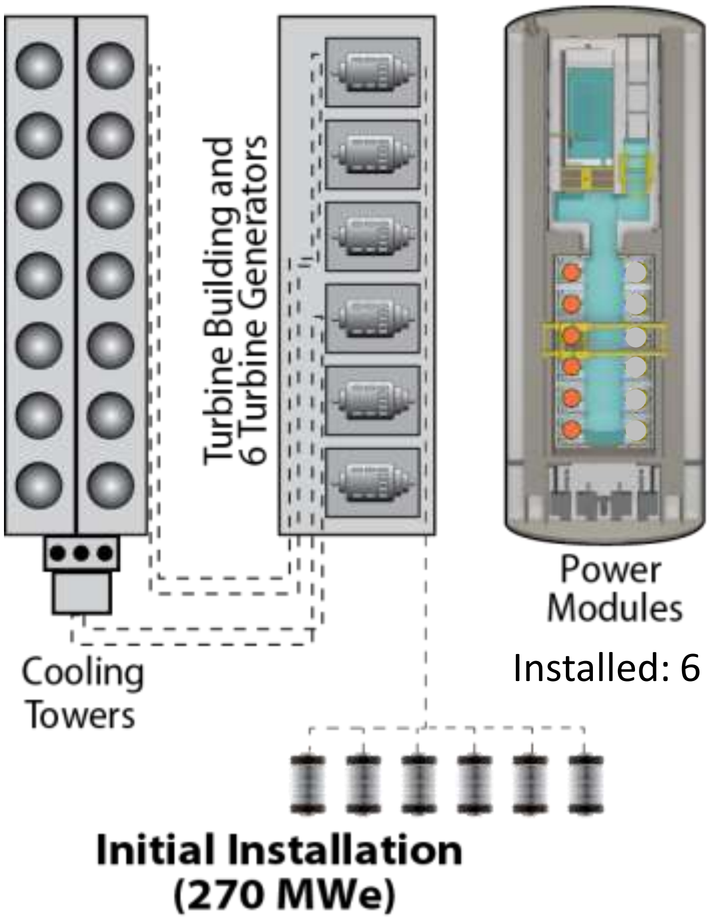


Cross-sectional View of Reactor Building



NuScale Power™

Incremental Build Out



NuScale Power™

NuScale Site layout

NuScale Power™

Innovation Requires Robust Testing Program

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 Evaluation

NuScale Power

1100 NE Circle Blvd, Suite 350
Corvallis, OR 97330
541-207-3931
http://www.nuscalepower.com

dingersoll@nuscalepower.com