



# **NuScale Power & Project WIN (Western Initiative for Nuclear)**

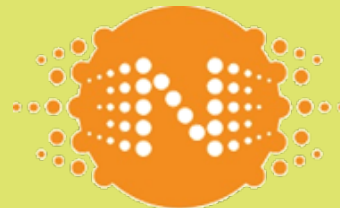
**Mike McGough**

**Chief Commercial Officer - NuScale Power**

**State of Idaho**

**Energy, Environment & Technology Committee**

**September 11, 2013**



**NUSCALE  
POWER™**

# NuScale Power History

- NuScale first of current US SMRs to enter commercial market.
- NuScale technology in development and design since 2000 (DOE) MASLWR program, lessons from AP1000 scaled testing
- Integral test facility first operational in 2003
- Began NRC design certification (DC) pre-application project in April 2008
- ~240 FTE's currently on project, ~\$160MM spent project life-to-date
- Twelve-reactor simulated control room operational in May 2012 for Human Factors Engineering development



*NuScale Engineering Offices  
Corvallis*



*One-third scale Test Facility*



*NuScale Control Room Simulator*



# Fluor: An American Company

**FLUOR**

- Acquired majority interest in NuScale in October 2011
- One of the world's leading publicly traded engineering, procurement, construction, maintenance, and project management companies
- #110 in the FORTUNE 500 in 2013
- More than 1,000 projects annually, serving more than 600 clients in 66 countries
- More than 41,000 employees worldwide
- Offices in more than 28 countries on 6 continents
- More than 100 years of experience



**Fluor Corporate Headquarters**  
*Dallas, Texas*

Revenue                    \$27.6 billion

*New awards*            \$27.1 billion

*Backlog*                    \$38.2 billion

**Investment Grade Credit Ratings:**

S&P                            A-

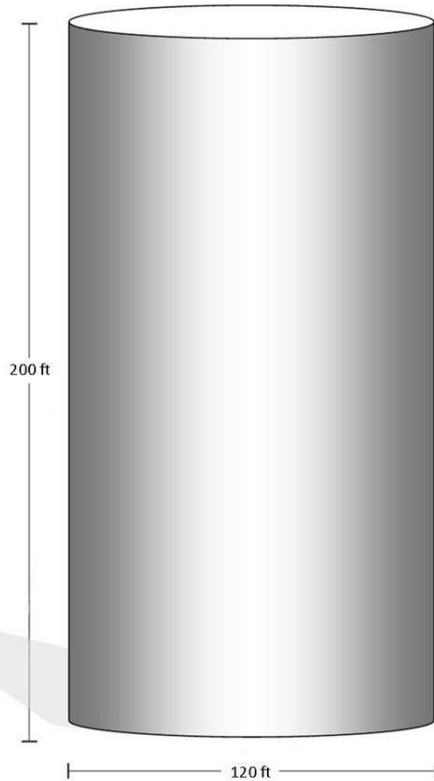
Moody's                    A3

Fitch                            A-



# Size Comparison

Comparison size envelope of new nuclear plants currently under construction in the United States

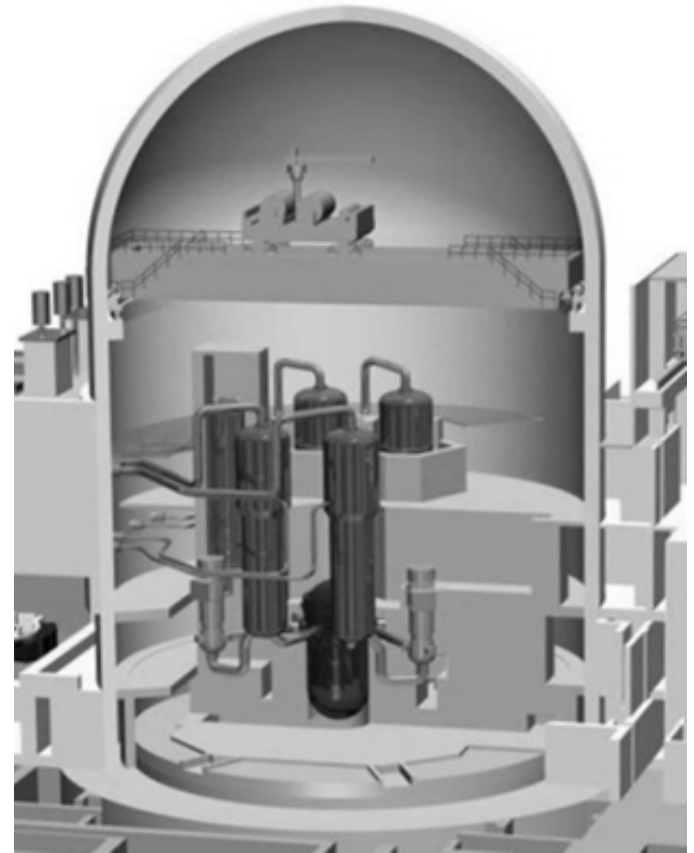


Containment

NuScale's combined containment vessel and reactor system



Typical Pressurized Water Reactor

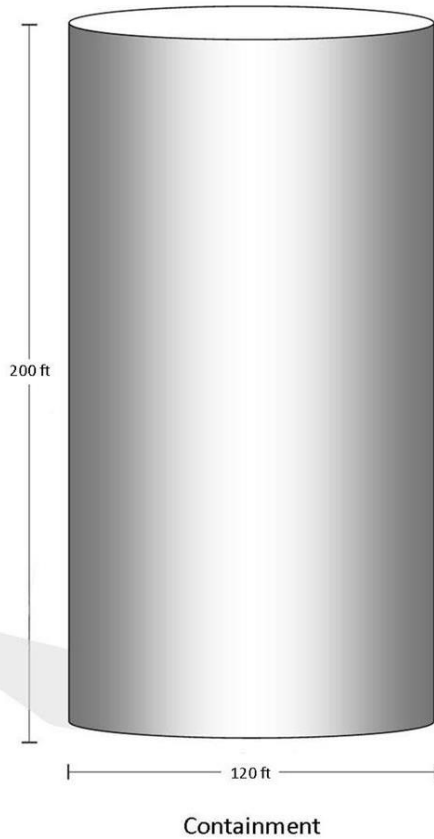


\*Source: NRC

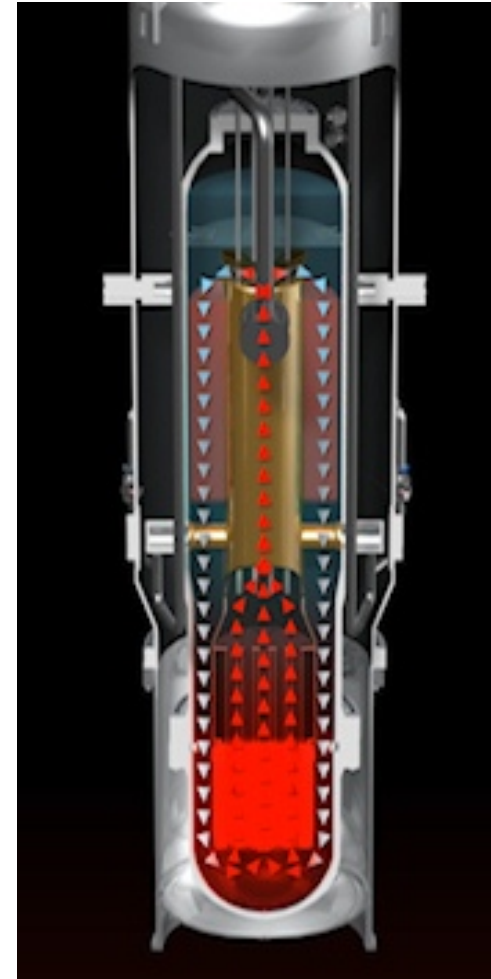


# Elegantly Simple Innovative Design

Comparison size envelope of new nuclear plants currently under construction in the United States

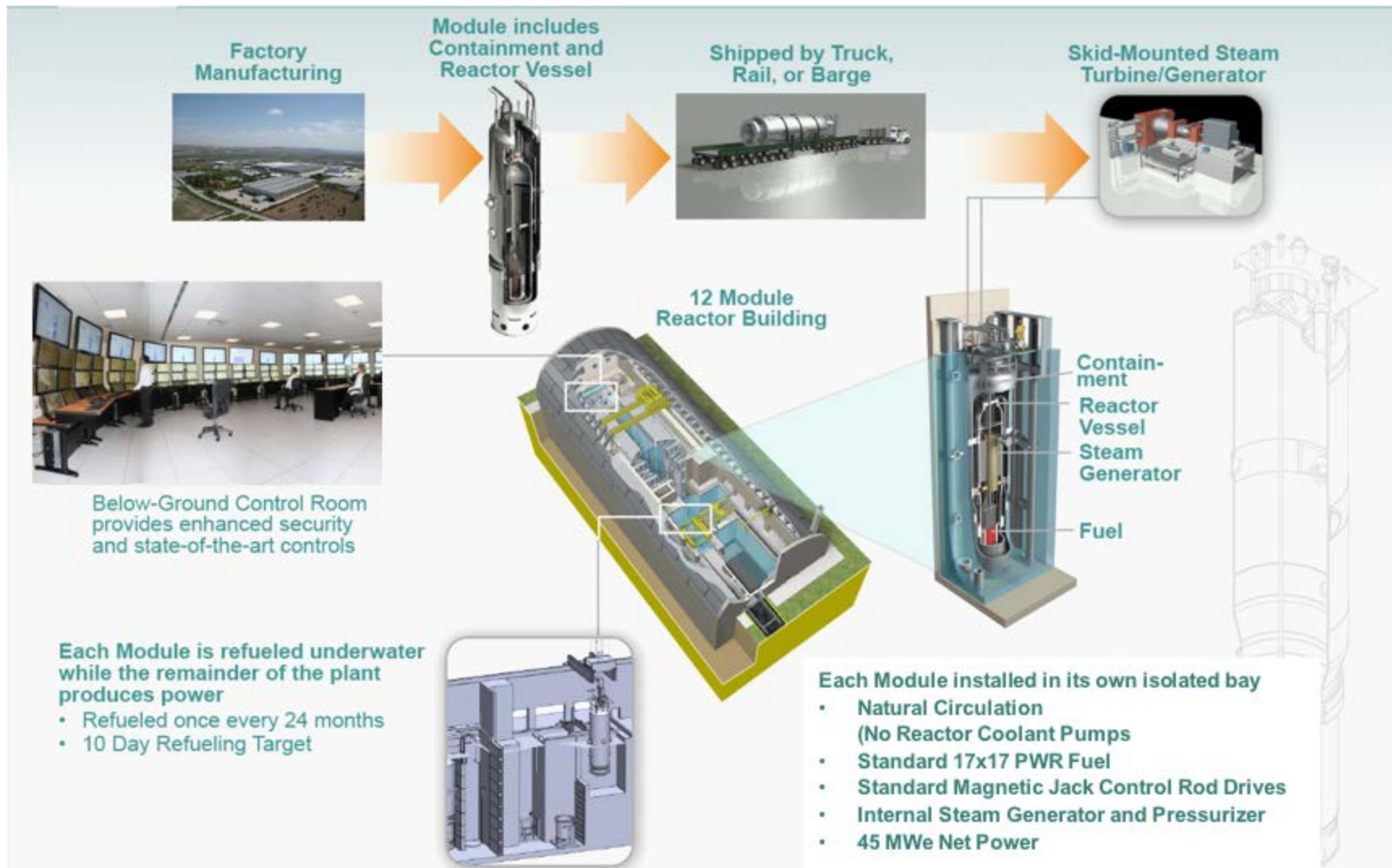


NuScale's combined containment vessel and reactor system

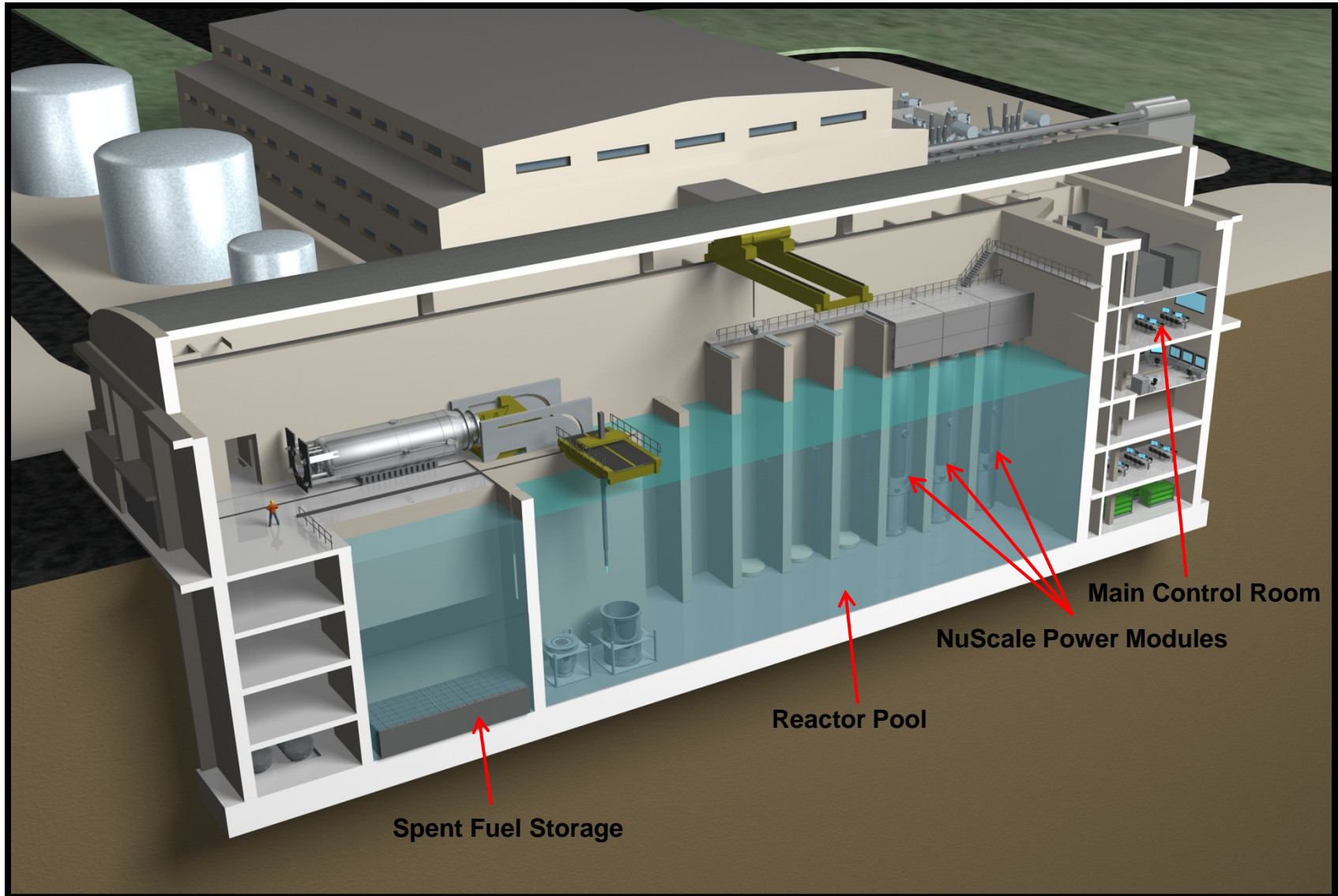




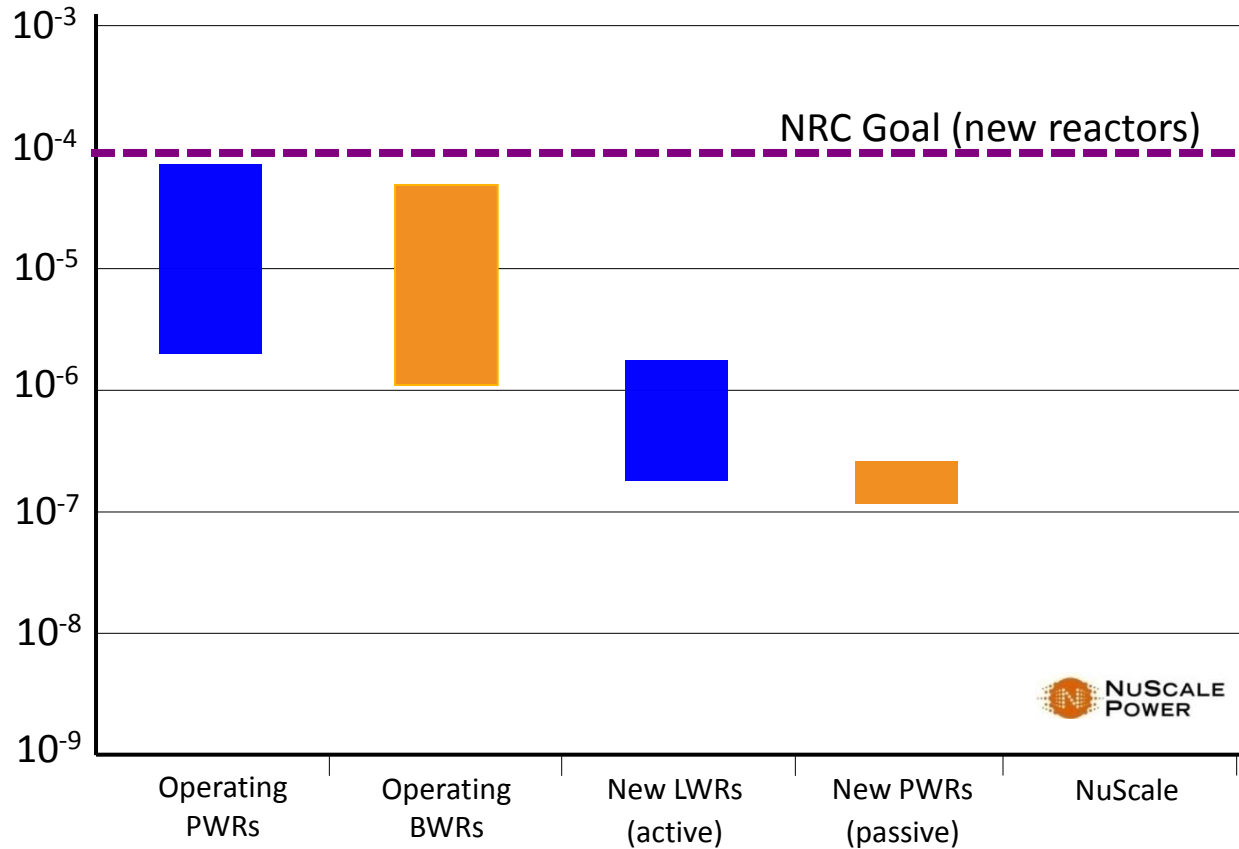
# NuScale Scalable Modular Design



# Reactor Building



# Core damage frequency significantly reduced



Source: NRC White Paper, D. Dube; basis for discussion at 2/18/09 public meeting on implementation of risk matrices for new nuclear reactors





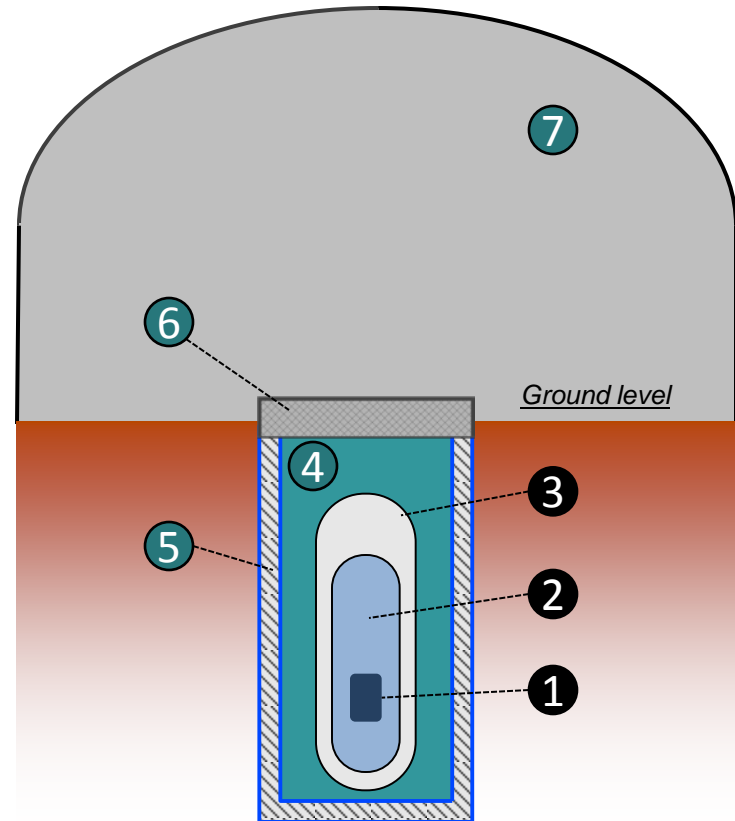
# Added Barriers Between Fuel and Environment Combined with reduced CDF, Supports Small EPZ

## Conventional Designs

1. Fuel Pellet and Cladding
2. Reactor Vessel
3. Containment

## NuScale's Additional Barriers

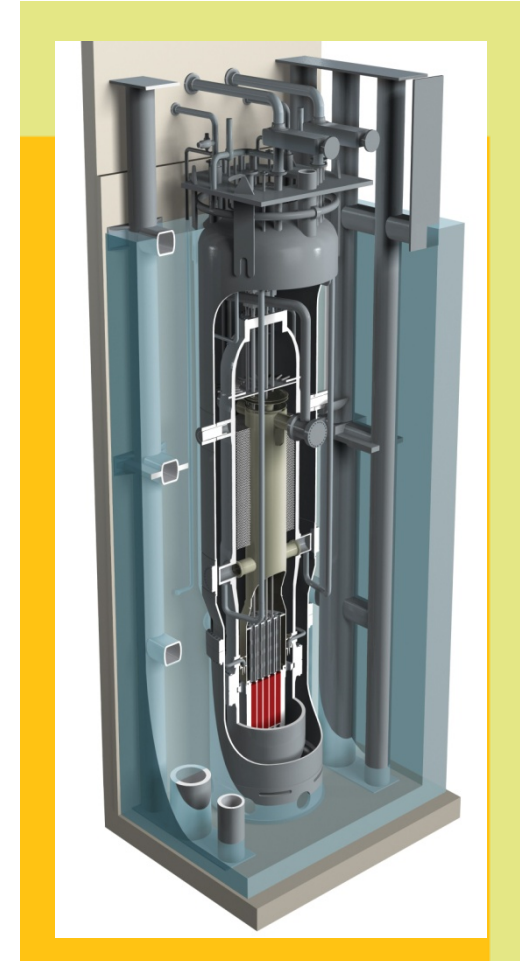
4. Water in Reactor Pool (11 million gallons)
5. Stainless Steel Lined Concrete Reactor Pool
6. Biological Shield Covers Each Reactor
7. Reactor Building



# NuScale Announces Major Breakthrough in Safety

## *Wall Street Journal April 16, 2013*

- NuScale design has achieved the “Triple Crown” for nuclear plant safety. The plant can safely shut-down and self-cool, indefinitely, with:
  - **No Operator Action**
  - **No AC or DC Power**
  - **No Additional Water**
- Safety valves align in their safest configuration on loss of all plant power.
- Details of the Alternate System Fail-safe concept were presented to the NRC in December 2012.

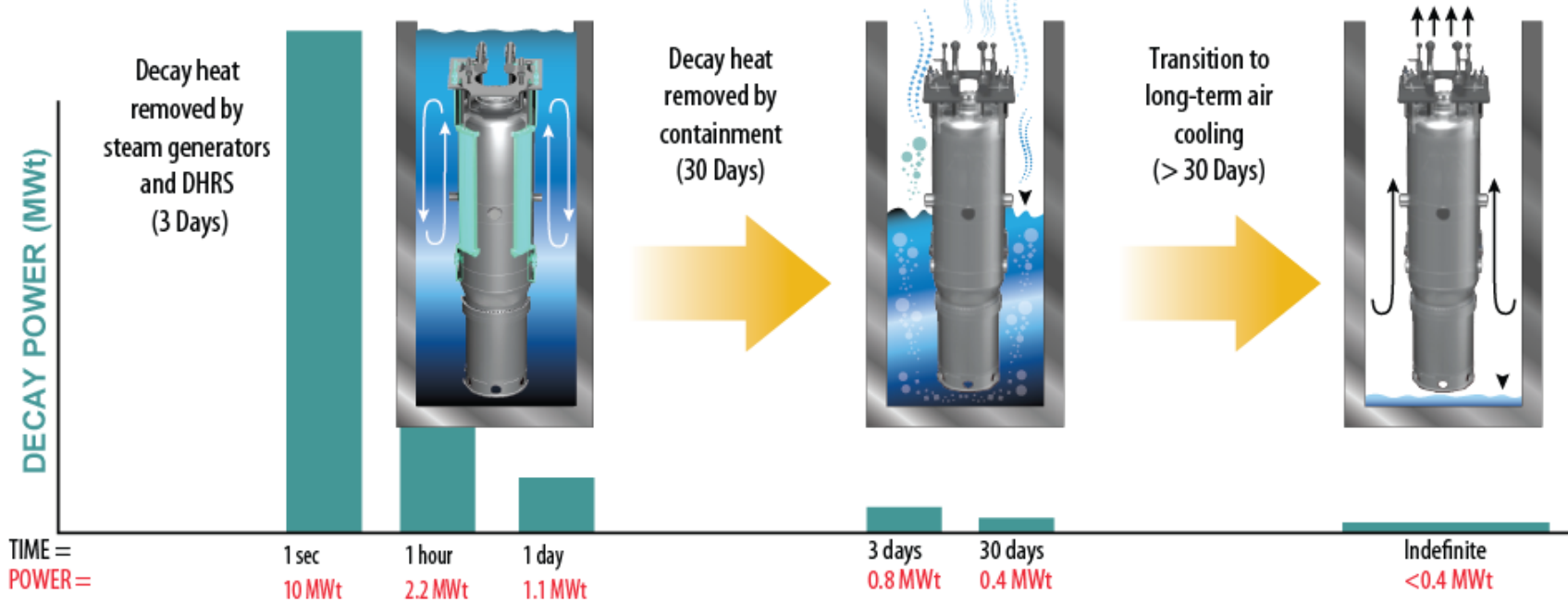


# Innovative Advancements to Reactor Safety

*Nuclear fuel cooled indefinitely without AC or DC power\**



**No Pumps • No External Power • No External Water**



# Full-Scale Main Control Room Simulator for HFE/HMI Studies



- NRC Review of HFE Program and Site Visit 1/13



# Western Initiative for Nuclear

- June 2010 Idaho Governor Butch Otter becomes WGA Chair
- WGA is 19-state/territory consensus org
- Gov. Otter sponsors Western Nuclear Energy Policy
- Signed out and Published June 2011, discussed SMR's
- Gov. Otter creates Idaho LINE commission
- June 2012 UT Governor Gary Herbert becomes WGA chair
- Gov. Herbert's initiative is 10-year energy plan
- June 30 2013 WGA 10-yr plan unveiled
- Stated Goal "Find ways to accelerate the introduction of small modular reactors into the marketplace."





# Nuclear Energy Reports Referencing SMRs

The Future of Nuclear Energy: Shaping a Western Policy—Western Governors' Association June 2011



The Future of Nuclear Energy:  
Shaping a Western Policy

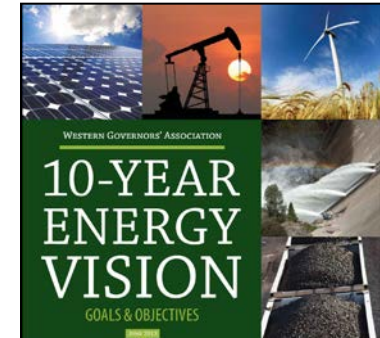
*In April 2011, the WGA convened a workshop on Nuclear Energy in the West with experts from the U.S. Department of Energy, U.S. Nuclear Regulatory Commission, Electric Power Research Institute, national laboratories, utilities, state and local governments, and public interest groups. We asked the participants to provide perspective on how the West could best position itself to consider the how nuclear energy can be a part of the clean energy future the West supports. The result of that work is contained in this document, "The Future of Nuclear Energy: Shaping a Western Policy."*

Leadership in Nuclear Energy Commission Executive Summary January 2013



*Recognizing that Idaho has a major strategic and economic interest in maintaining INL's leadership role and in helping the nuclear energy industry successfully meet these broader challenges, Idaho governor C.L. "Butch" Otter established the Leadership in Nuclear Energy or "LINE" Commission in February 2012.*

Western Governors' Association "10-Year Energy Vision" Goals & Objectives June 2013



*The Governors support the following objective:*

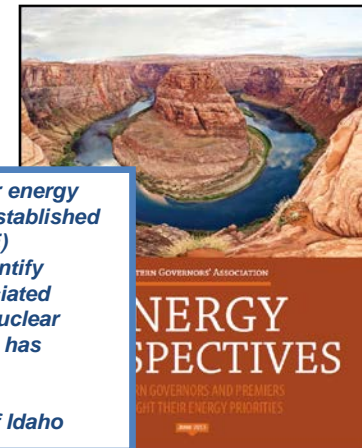
- Find ways to accelerate the introduction of small modular reactors into the marketplace.



Western Governors' Association "State of Energy in the West" June 2013

*The Western United States plays a critical role in meeting our nation's energy needs. From conventional fuels to renewable energy, the West's resources provide the majority of the United States' energy supply. These resources are good news for the West and its residents. They also present a challenge: Can the Western states create an approach to development that delivers energy in a way that is secure, affordable and respects the environment?*

Western Governors' Association "Energy Perspectives" June 2013



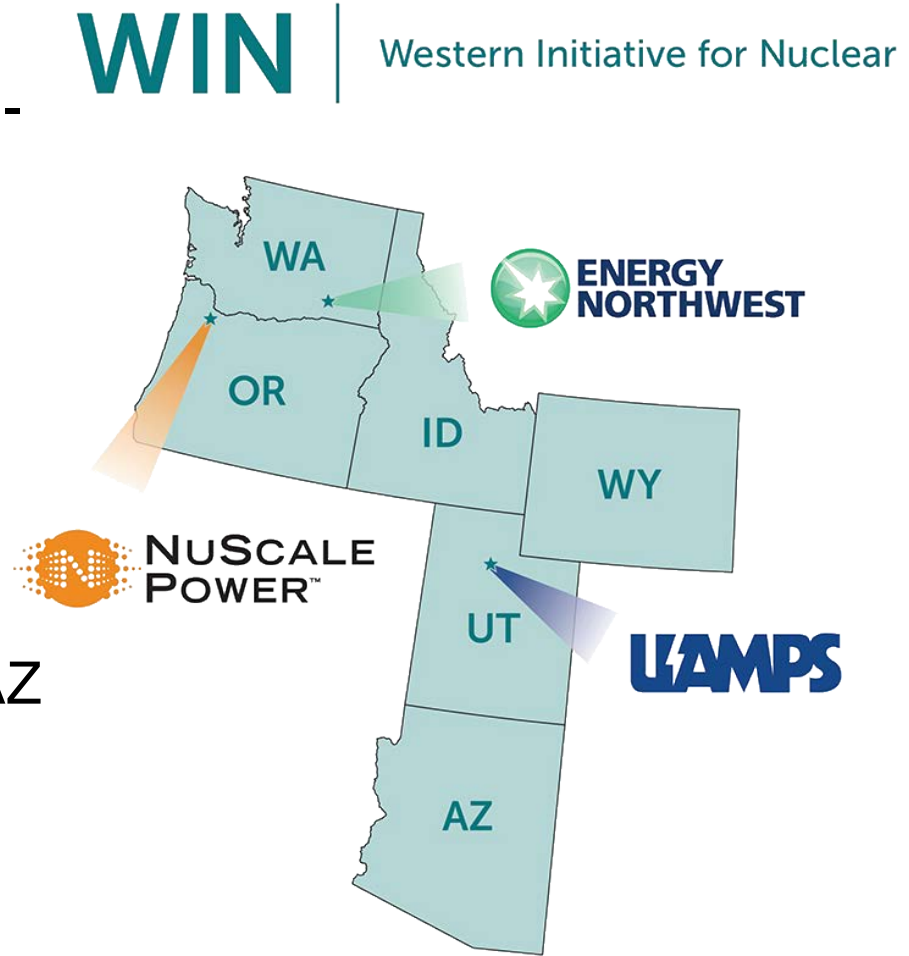
*Recognizing the significance of nuclear energy research and development in Idaho, I established the Leadership in Nuclear Energy (LINE) Commission in 2012 to assess and quantify the opportunities and challenges associated with hosting the INL and a significant nuclear manufacturing and services sector that has emerged as a result of the DOE site.*

- Gov. C.L. "Butch" Otter, State of Idaho



# What is Project WIN?

- Western Initiative for Nuclear (Project WIN) is an exclusive multi-western state collaboration to investigate the demonstration and deployment of an innovative SMR design developed by NuScale Power.
- Involved WIN participants: NuScale, UAMPS, Energy Northwest, ID, UT, OR, WA, WY, AZ

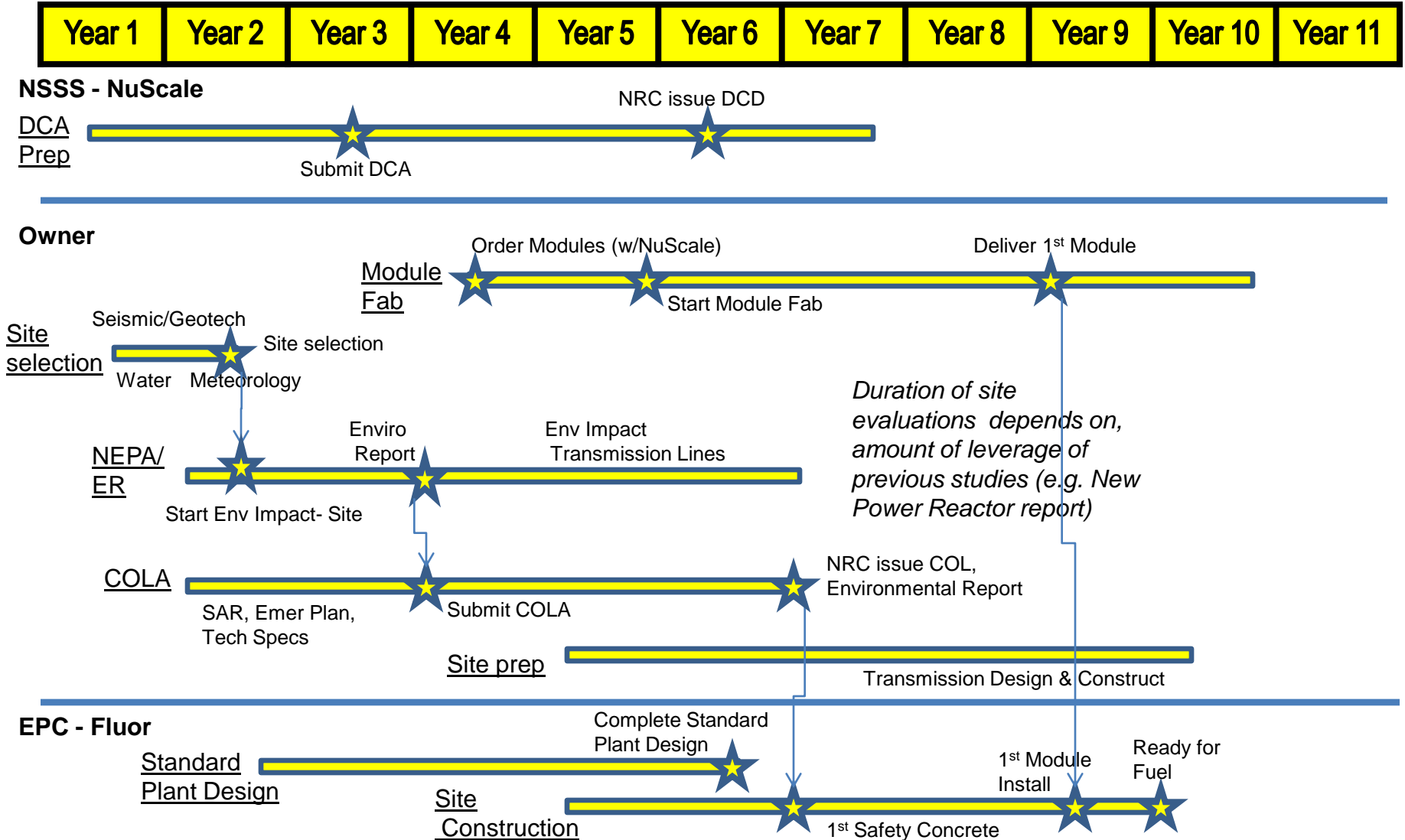


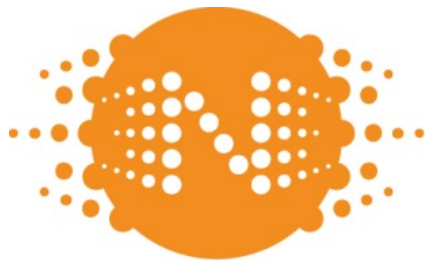
# DOE FOA Program Outline

- FOA1 Awarded \$150MM to B&W November 2012
- FOA2 Issued – March 11, 2013
  - Letter of Intent to submit proposal due – April 5, 2013
  - FOA questions due – April 30, 2013
  - Industry Day – May 15, 2013
  - Proposals Due – July 1, 2013
  - Site visits and orals – optional (on 10 days notice)
  - Notify award candidates by – Sept. 17, 2013
  - Award – Jan. 16, 2014
- Expected number of Awards – 1+
- Funding – up to \$226M if a single award
- Revised FOA2 Criteria, Innovation, Fukushima Resistance, Licensability timeline



# NuScale Project Timeline





# NUSCALE POWER™



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