Instrumentation and Controls:
Safety-Focused Review Initiative

Advanced Reactors Stakeholders Meeting
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The staff is transforming I&C reviews
The I&C regulatory infrastructure is not optimal for future designs

- Large light water reactors
- Increased complexity and volume
- Opportunities for safety focus, risk-informing, and simplicity

What is the safety issue?
The staff innovated its review approach for SMRs

- Lessons learned from reviews of other large light water designs
- Design-Specific Review Standard (DSRS) Chapter 7
  - “Grassroots”
  - SRM-SECY-11-0024
  - New
  - NuScale
  - Generically applicable
  - Mindset/cultural change
  - Cooperation with applicants

SRM: Staff Requirements Memorandum
DSRS Chapter 7 is simpler and more safety-focused

- Emphasis on fundamental design principles
- Risk-informed/safety focused review
- Removed inapplicable items and duplications
- Restructured staff guidance in NUREG-0800
- Lessons learned applied
The new approach has been a huge success for NuScale

• Highly effective
  – Demonstrated principles
  – Simplicity
  – Easily understandable/explainable

• Highly efficient
  – 95% reduction of RAIs
  – Significant reduction of staff hours and below the estimated

• Significantly ahead of schedule

• Applicant doing its part
  – Cooperation with staff
  – Cultural/mindset change
The Commission directed the staff to “modernize”

- Integrated Action Plan
  - SRM-SECY-16-0070

- Regulatory infrastructure
  - “...simpler, streamlined, and agile... for new and advanced reactors.”
  - Principles/attributes, e.g.,
    - Performance-based
    - Technology-neutral
    - Consistent, durable, predictable, scalable
    - Unambiguous
    - Safe and secure
The staff is getting ready for future designs

- Additional lessons learned and new opportunities
  - Create new, improved guidance for future design reviews in a timely manner
  - Building on DSRS
- New initiative started
  - Advanced reactors
  - I&C modernization
  - Innovation and transformation at the NRC
The staff plans to issue “DRS” in time for advanced reactors

• Lessons learned from NuScale and APR1400

• More:
  – Risk-informed and performance-based
  – Safety focus
  – Technology-neutral
  – Principles-based
  – Agile/flexible
  – Efficient/predictable

• Balancing with defense-in-depth strategy

1. What can go wrong?
2. How likely is it?
3. What are the consequences?
Success is ensured when...

- **Success factors**
  - Cultural
  - Initiative
  - Applicant cultural/mindset change

- **Fundamentals**
  - Regulatory
  - Technical

- **Principles**
  - Safety engineering
  - Safety design

*If you do what you’ve always done, you will get what you’ve always gotten.*  - Tony Robbins
In summary

• The staff initiated an innovative, safety-focused approach for I&C reviews applying lessons learned
• The approach has been a huge success for NuScale
• The staff is further transforming I&C reviews for future designs
• The staff and stakeholders must work closely