



LO-0716-50089

July 07, 2016

Docket: PROJ0769

U.S. Nuclear Regulatory Commission  
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**SUBJECT:** NuScale Power, LLC Submittal of Presentation Materials Entitled "NuScale ITAAC,"  
Revision 0, PM-0716-50088 for Use During Public Meeting on July 20, 2016 (NRC  
Project No. 0769)

NuScale Power, LLC (NuScale) has requested a public meeting with the NRC staff on July 20, 2016, to discuss Inspections, Tests, Analysis and Acceptance Criteria (ITAAC.) The purpose of this submittal is to provide presentation material prepared for use during this meeting. The presentation material has been determined to be nonproprietary.

Enclosure 1 is the nonproprietary version of the presentation entitled "NuScale ITAAC".

This correspondence includes preliminary and/or conceptual information, which reflects the current stage of the NuScale design and may be subject to change. This letter and its enclosures make no regulatory commitments and no revisions to any existing regulatory commitments.

Please feel free to contact me at 301-770-0472 or at [smirsky@nuscalepower.com](mailto:smirsky@nuscalepower.com) if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Steve Mirsky".

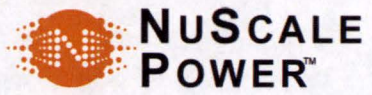
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Enclosure 1: "NuScale ITAAC," PM-0716-50088-NP, Revision 0, nonproprietary version

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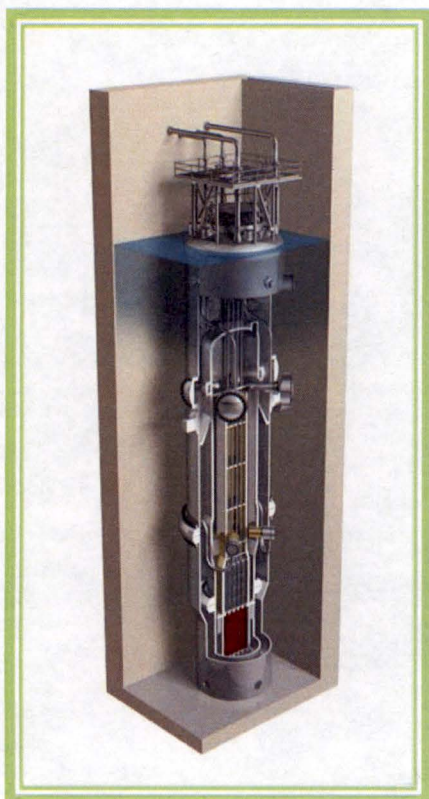


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**Enclosure 1:**

"NuScale ITAAC," PM-0716-50088-NP, Revision 0, nonproprietary version

# NuScale ITAAC



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**Regulatory Affairs Manager**  
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*July 20, 2016*

# Acknowledgement and Disclaimer

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This material is based upon work supported by the Department of Energy under Award Number DE-NE0000633.

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# Purpose

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- Provide an assessment of the NRC ITAAC letters to NuScale (April 8, 2016 and June 21, 2016)
- Inform the NRC on the contents of the ITAAC that will be in Part 8 of the NuScale DCA
- Elicit NRC feedback on the NuScale ITAAC

# NEI 15-02 Proposed Standardized ITAAC

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## Chronology

- NRC/NEI ITAAC meetings from September 2013 to April 2015
- NEI 15-02, Draft A, of Rev. 0, Industry Guideline for the Development of Tier 1 and ITAAC Under 10 CFR Part 52, submitted to the NRC on May 27, 2015
- NRC letters to Thomas Bergman, Vice President, Regulatory Affairs, NuScale Power, LLC, dated April 8, 2016 and June 21, 2016

# NEI 15-02 Proposed Standardized ITAAC

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- Extensive SMR industry engagement with the NRC since 2013 has significantly improved ITAAC for both SMRs and large LWRs including:
  1. Mutual agreement and understanding on Tier 1 design description and ITAAC first principles .
  2. Standardization and simplification of ITAAC language.
  3. Content and relationship of Tier 2 Section 14.3 to ITAAC.
  4. Integration of lessons learned from recent DCA and COL ITAAC.

# Tier 1 Design Description and ITAAC First Principles<sup>1</sup>

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1. Tier 1 Design Descriptions describe the **top-level design features and performance characteristics of the plant.**
2. The amount of detail in Tier 1 Design Descriptions is proportional to the safety and risk significance of the top-level design feature or performance characteristic (i.e., a graded approach).
3. Tier 1 Design Descriptions are derived solely from the Tier 2 design information, and ITAAC Design Commitments are derived solely from Tier 1 Design Descriptions.

<sup>1</sup>NEI 15-02, May 2015



# Tier 1 Design Description and ITAAC First Principles<sup>1</sup>

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4. Tier 1 Design Descriptions describe SSC for which construction or installation in the final location will be completed prior to fuel loading, and are expected to be in place for the lifetime of the plant.
5. ITAAC provide reasonable assurance that the constructed facility conforms with NRC regulations related to design and performance of safety functions.
6. Tier 1 Design Descriptions reflect the Commission's intent to balance the goal of standardization with the need to provide flexibility to applicants and licensees to make certain changes without prior NRC approval.
7. ITAAC are a focused subset of construction verification activities.

<sup>1</sup>NEI 15-02, May 2015

# Top-Level Design Features and Performance Characteristics<sup>1</sup>

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- Reactor coolant pressure boundary (RCPB)
- Containment pressure boundary
- Seismic Category I structures
- Safety-related equipment qualification
- Safety-related mechanical equipment
- Class 1E protection system (reactor trip and ESF actuation)
- Class 1E power for safety-related equipment
- New and spent fuel storage
- Main control room habitability
- Nonsafety-related SSC providing protection of safety-related SSC
- Nonsafety-related SSC providing radiation protection essential to prevent excessive exposure or release of radioactive material
- Human factors engineering essential to shut down the reactor and maintain it in a safe shutdown condition
- Certain risk-significant functions performed by nonsafety-related SSC

<sup>1</sup>NEI 15-02, May 2015

# NRC Proposed Standardized ITAAC

## NRC Response to NEI 15-02 Submittal

Number of ITAAC	ITAAC Description	
129	Standardized ITAAC Proposed in NEI 15-02 Appendix C	
-1	NRC Response-Deleted C02	
16	NRC Response-Added 16 ITAAC	
144	<b>NRC Proposed Standardized ITAAC</b>	
	82	NRC Response-Proposed Revisions
	46	NRC Response-No NRC Proposed Revisions
	16	NRC Response-Added 16 ITAAC

# Standardized ITAAC

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## Standardized ITAAC types

- A (ASME)
- C (Containment)
- E (Electrical)
- F (Fire Protection)
- H (Human Factors Engineering)
- HB (Hazard Barrier)
- I (Instrumentation and Control)
- M (Mechanical)
- Q (Qualification)
- R (Radiation Protection)
- S (Structural)

# NuScale ITAAC

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- Using the process in draft NEI 15-02, NuScale has identified 58 NRC-proposed standardized ITAAC for which NuScale does not have the design feature described in the ITAAC.

# NuScale ITAAC

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Summary of NRC proposed standardized ITAAC applicability to the NuScale design

# ITAAC	ITAAC Description
144	<b>NRC Proposed Standardized ITAAC</b>
-58	NuScale does not have the design feature described in the ITAAC
86	<b>NRC Proposed Standardized ITAAC Applicable to NuScale Design (ITAAC Contains NuScale Design Feature)</b>

# NuScale ITAAC

NRC proposed standardized ITAAC not applicable to NuScale design (Types A, C, E, and F)

# of ITAAC	Standardized ITAAC	Design Feature Not Applicable to NuScale Design
1	A01	ASME Design Acceptance Criteria (DAC)
1	A03	ASME piping whose ASME code of record is the 1992 Edition with 1994 Addenda through the 2004 Edition with 2005 Addenda
1	A06	Pipe Break Analysis Report Design Acceptance Criteria (DAC)
2	C01, C03	Hydrogen Igniters and/or Passive Autocatalytic Recombiners
25	E01-E04; E06-E14; E17-E23; E25-E28; E30	Class 1E Power
1	E29	Emergency Diesel Generator
1	F02	Common Water Source for the Fire Protection System
1	F03	Remote Transfer Switches to Transfer Control from Main Control Room Remote Shutdown Station
1	F07	Seismic Category I Fire Protection System

# NuScale ITAAC

NRC proposed standardized ITAAC not applicable to NuScale design (Type M)

# of ITAAC	Standardized ITAAC	Design Feature Not Applicable to NuScale Design
1	M03	Steam Dryer
2	M04, M05	Safety-Related Pumps
1	M10	Safety-Related Vent Valves in Piping System
1	M12	Safety-Related HVAC
1	M14	Safety-Related Dampers
1	M13	Safety-Related Fans
1	M18	Safety-Related Batteries
1	M23	Sumps To Detect Reactor Coolant Pressure Boundary Leak
1	M24	Radiation Monitors To Detect A Reactor Coolant Pressure Boundary Leak
2	M11, M30	Reactor Coolant Pumps
1	M31	New Fuel Storage Racks
1	M34	Mid-Loop Operation



# NuScale ITAAC

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NRC proposed standardized ITAAC not applicable to NuScale design (Types Q, R, and S)

# of ITAAC	Standardized ITAAC	Design Feature Not Applicable to NuScale Design
1	Q07	Safety-Related Pumps
1	Q10	Safety-Related Tornado Dampers
1	R09	Containment Radiation Monitor
1	R11	Safety-Related HVAC System
3	S03, S04, S05	ASME Code Class MC Components
3	S06, S07, S08	Concrete Containment

# NuScale ITAAC

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- NuScale, in concert with the NEI ITAAC team that developed NEI 15-02, reviewed the NRC proposed standardized ITAAC that are applicable to NuScale design (86 ITAAC).
- The summary of the NuScale ITAAC applicable to NuScale design is provided on the next slide.

# NuScale ITAAC

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Summary of NRC proposed standardized ITAAC applicable to NuScale design

# ITAAC	ITAAC Description
86	<b>NRC Proposed Standardized ITAAC Applicable to NuScale Design (ITAAC Contains NuScale Design Feature)</b>
57	No Change Proposed; Use as is
22	Revisions to NRC Standardized ITAAC
6	NuScale will not submit new ITAAC I22, I25, M27, M28, R07, R08
1	Exemption for ITAAC C04 part i

# NuScale ITAAC

## Proposed revisions to NRC standardized ITAAC (1/3)

ITAAC	Proposed Revisions
C04	NuScale will apply for exemption to ILRT (part i of ITAAC Acceptance Criteria)
E24	Minor wording change
HB2	Provide reference to a report rather than a table in the ITAAC Acceptance Criteria
HB5	Provide reference to a report rather than a table in the ITAAC Acceptance Criteria
I01	Deletion of the phrase “and that software were implemented per licensing commitments” in the Tier 2, Section 14.3, Discussion of ITAAC Implementation
I15	Add reference to Tier 1 table in ITAAC Acceptance Criteria and Tier 2, Section 14.3, Discussion of ITAAC Implementation
I21	Add brackets to ITAAC Acceptance Criteria and Tier 2, Section 14.3, Discussion of ITAAC Implementation
I22	NuScale will not submit ITAAC I22
I23	Discuss scope of ITAAC as it relates to important human actions
I25	NuScale will not submit ITAAC I25

# NuScale ITAAC

## Proposed revisions to NRC standardized ITAAC (2/3)

ITAAC	Proposed Revisions
M06, M07, M08	Deletion of a portion of the ITAAC Acceptance Criteria to perform equipment qualification verification activities during preoperational testing
M16	Revise Tier 2 Section 14.3 Discussion of ITAAC Implementation to allow use of a manual signal, actual automatic signal, or simulated automatic signal in conducting the preoperational test as allowed by multiple other ITAAC
M20	Minor wording change to align Tier 2, Section 14.3, Discussion with ASME NOG-1
M25	Minor wording change to correct ITAAC reference numbers and minor revision to ITAAC ITA
M27	NuScale will not submit ITAAC M27 for DCA
M28	NuScale will not submit ITAAC M28 for DCA
M33	Discuss proposal to use NEI-proposed standardized ITAAC R03 (renumbered as M33) instead of the NRC-proposed M33

# NuScale ITAAC

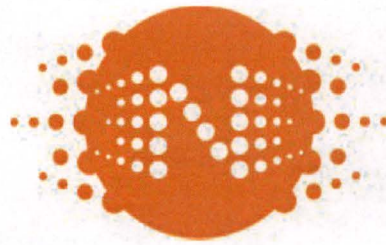
## Proposed revisions to NRC standardized ITAAC (3/3)

ITAAC	Proposed Revisions
Q01, Q06	Delete reference to NRC Regulatory Guides and industry standards in the ITAAC Acceptance Criteria. Delete reference to Tier 2* in Tier 2, Section 14.3, Discussion of ITAAC Implementation
Q04	Minor wording change to align ITAAC language with referenced Regulatory Guide 1.209
Q09	Revise ITAAC ITA to allow type testing of safety-related heat exchangers
R02	Revise ITAAC to delete reference to Tier 1 table
R06	Revise ITAAC Acceptance Criteria and Tier 2, Section 14.3, Discussion of ITAAC Implementation to allow use of a manual signal, actual automatic signal, or simulated automatic signal in conducting the preoperational test as allowed by multiple other ITAAC
R07	NuScale will not submit ITAAC R07 for DCA
R08	NuScale will not submit ITAAC R08 for DCA
S01	Revise ITAAC Acceptance Criteria to delete reference to Tier 1 table or figure
S09	Revise ITAAC commitment to delete reference to regulatory guide and minor word changes to Tier 2, Section 14.3, Discussion of ITAAC Implementation

# Summary

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- NuScale evaluated the NRC April 8, 2016 and June 21, 2016 ITAAC letters and attachments
  - 58 of these ITAAC involved a design feature that NuScale does not have and will not be in the DCA
  - Of the remaining 86 ITAAC
    - 57 will be used with the language provided by the NRC
    - 22 of these ITAAC will have some revised text
    - 6 of these ITAAC will not be submitted
    - 1 will have an exemption request (C04, part i)
  - NEI and the SMR industry has reviewed and agreed with NuScale's evaluation
  - The NuScale ITAAC will be in Tier 1 of the DCA
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