

From: Tabatabai, Omid <Omid.Tabatabai-Yazdi@nrc.gov>
Sent: Friday, September 28, 2018 10:17 AM
To: spope@nuscalepower.com
Cc: Wike, Jennie; Fosaaen, Carrie
Subject: Fwd: NuScale Options.docx
Attachments: NuScale Options.docx

Steve,

This email and the attached file respond to the questions and request by NuScale during the 9/26/2018 teleconference between the NRC staff and NuScale regarding the NRC staff's review of NuScale initial test program. If you have any questions, please let me know.

Thanks,
Omid

Begin Forwarded Message:

From: "Kavanagh, Kerri" <Kerri.Kavanagh@nrc.gov>
Subject: FW: NuScale Options.docx
Date: 28 September 2018 14:04
To: "Tabatabai, Omid" <Omid.Tabatabai-Yazdi@nrc.gov>
Cc: "Cranston, Gregory" <Gregory.Cranston@nrc.gov>, "Franovich, Rani" <Rani.Franovich@nrc.gov>, "Lamb, Taylor" <Taylor.Lamb@nrc.gov>, "Prescott, Paul" <Paul.Prescott@nrc.gov>

Hi Omid,

During our call with NuScale on 9/26/18 to discuss review options related to the ITP, NuScale requested that the staff provide a listing of the test abstracts that were discussed in Option 3. The attached document provides the requested information along with the description of the three options. In addition, NuScale asked whether the staff planned on reviewing the front matter of Section 14.2 (up to the test abstracts) and the COL items. The answer is yes that staff would be reviewing the COL Items and Section 14.2 front matter.

It is our recommendation that the email to them and the attached document be put into ADAMS. Please let us know if NuScale has any further questions.

Thanks

Kerri

301-415-3743

Option 1: Cease Review of the NuScale Initial Test Program (ITP)

There is no regulatory requirement for an ITP for a design certification. The Combined License (COL) applicant would be responsible to submit an ITP that would meet the revised staff guidance. No additional resources would be needed.

Option 2: Review of the Safety Significant System Functions

Finality would be limited to a test existing (listed beneath the abstracts) for each of the risk significant system functions identified in the design reliability assurance program (D-RAP), but not on the test abstracts. The COL applicant would be responsible for a program that would meet the revised staff guidance, i.e., test abstracts that test the entire system. Approximate resources needed to complete Phase 2 by internal deadline on October 31st: 20 hours.

- Table 14.2-43: Containment System Test #43
 - Test #43-1
- Table 14.2-52: Reactor Building Cranes Test #52
 - Test #52-1
 - Test #52-2
- Table 14.2-63: Module Protection System Test #63
 - Test #63-1
 - Test #63-4
 - Test #63-5
 - Test #63-6

Option 3: Review Test Abstracts (A1, A2, B1, and some B2) consistent with DSRS for System Level Tests

As stated in the design specific review standard (DSRS) Section 14.2:

The regulations in 10 CFR 50.43(e) also apply to DC and COL applications licensed under 10 CFR 52.47(a)(2)(iii), 10 CFR 52.47(c)(2) and 10 CFR 52.79(a)(28). In practice, the DC applicant would provide design and test acceptance criteria for its portion of the design while the COL applicant would provide design and test acceptance criteria for the site-specific design features (e.g., ultimate heat sink). The COL would then put into place plans for preoperational, initial criticality, low-power, and power ascension tests under the ITP.

The DSRS also states:

The applicant should provide test abstracts of SSCs and unique design features that will be tested to verify that *system* and component performance is in accordance with the design. These test abstracts should include the objectives, tests, and acceptance criteria that will be included in the test procedures.

Finality could be provided for the test abstracts identified below (the list *may* change). However, for test abstracts that are not reviewed by the staff, finality cannot be provided. The focus would

be on test abstracts containing A1, A2, and B1 systems, as well as ITAAC and FOAK testing. The COL applicant would still be responsible for providing appropriate procedures. Resources needed to complete Phase 2 by estimated internal deadline of December 21st (subject to change): *at least* 600 hours.

- Table 14.2-4: Pool Surge Control System Test #4
- Table 14.2-5: Ultimate Heat Sink Test #5
- Table 14.2-9: Auxiliary Boiler System Test #9
- Table 14.2-18: Control Room Habitability System Test #18
- Table 14.2-19: Normal Control Room HVAC System Test #19
- Table 14.2-20: Reactor Building HVAC System Test #20
- Table 14.2-24: Balance-of-Plant Drains Test #24
- Table 14.2-25: Fire Protection Systems Test #25
- Table 14.2-33: Turbine Generator Test #33
- Table 14.2-35: Liquid Radioactive Waste System Test #35
- Table 14.2-36: Gaseous Radioactive Waste System Test #36
- Table 14.2-38: Chemical and Volume Control System Test #38
- Table 14.2-41: Containment Evacuation System Test #41
- Table 14.2-42: Containment Flooding and Drain System Test #42
- Table 14.2-43: Containment System Test #43
- Table 14.2-44: Control Rod Drive System Flow-Induced Vibration Test #44
- Table 14.2-45: Reactor Vessel Internals Flow-Induced Vibration Test #45
- Table 14.2-46: Reactor Coolant System Test #46
- Table 14.2-47: Emergency Core Cooling System Test #47
- Table 14.2-48: Decay Heat Removal System Test #48
- Table 14.2-51: Fuel Handling Equipment System Test #51
- Table 14.2-52: Reactor Building Cranes Test #52
- Table 14.2-60: Plant Lighting System Test #60
- Table 14.2-63: Module Protection System Test #63
- Table 14.2-66: Safety Display and Indication Test #66
- Table 14.2-68: Communication System Test #68
- Table 14.2-70: Hot Functional Testing Test #70
- Table 14.2-72: Steam Generator Flow-Induced Vibration Test #72
- Table 14.2-73: Security Access Control Test #73
- Table 14.2-74: Security Detection and Alarm Test #74
- Table 14.2-76: Initial Fuel Load Test (Test #76)
- Table 14.2-77: Reactor Coolant System Flow Measurement Test (Test #77)
- Table 14.2-78: NuScale Power Module Temperature Test (Test #78)
- Table 14.2-79: Primary and Secondary System Chemistry Test (Test #79)
- Table 14.2-80: Control Rod Drive System – Manual Operation, Rod Speed, and Rod Position Indication Test (Test #80)
- Table 14.2-81: Control Rod Assembly Drop Time Test (Test #81)
- Table 14.2-82: Pressurizer Spray Bypass Flow Test (Test #82)

- Table 14.2-83: Initial Criticality Test (Test #83)
- Table 14.2-84: Post-Critical Reactivity Computer Checkout Test (Test #84)
- Table 14.2-86: Determination of Zero-Power Physics Testing Range Test (Test #86)
- Table 14.2-87: All Rods Out Boron Endpoint Determination Test (Test #87)
- Table 14.2-88: Isothermal Temperature Coefficient Measurement Test (Test #88)
- Table 14.2-89: Bank Worth Measurement Test (Test #89)
- Table 14.2-91: Core Power Distribution Map Test (Test #91)
- Table 14.2-92: Neutron Monitoring System Power Range Flux Calibration Test (Test #92)
- Table 14.2-93: Reactor Coolant System Temperature Instrument Calibration Test (Test #93)
- Table 14.2-94: Reactor Coolant System Flow Calibration Test (Test #94)
- Table 14.2-95: Radiation Shield Survey Test (Test #95)
- Table 14.2-96: Reactor Building Ventilation System Capability (Test #96)
- Table 14.2-97: Thermal Expansion Test (Test #97)
- Table 14.2-98: Control Rod Assembly Misalignment (Test #98)
- Table 14.2-99: Steam Generator Level Control Test (Test #99)
- Table 14.2-100: Ramp Change in Load Demand (Test #100)
- Table 14.2-101: Step Change in Load Demand Test (Test #101)
- Table 14.2-102: Loss of Feedwater Heater Test (Test #102)
- Table 14.2-103: 100 Percent Load Rejection Test (Test #103)
- Table 14.2-104: Reactor Trip from 100 Percent Power Test (Test #104)
- Table 14.2-105: Island Mode Test for NuScale Power Module #1 (Test #105)
- Table 14.2-106: Island Mode Test for Multiple NuScale Power Modules (Test #106)
- Table 14.2-107: Remote Shutdown Workstation Test (Test #107)
- Table 14.2-108: NuScale Power Module Vibration Test (Test #108)