

June 17, 2015

U.S. Nuclear Regulatory Commission
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SUBJECT: NuScale Power, LLC and Utah Associated Municipal Power Systems Combined Response to NRC Regulatory Issue Summary 2015-07

REFERENCE: NRC Regulatory Issue Summary (RIS) 2015-07, "Process for Scheduling and Allocating Resources in FY 2017 for the Review of New Licensing Applications for Large Light-Water Reactors and Small Modular Reactors," dated May 11, 2015 (ML14101A166)

On May 11, 2015, the NRC published NRC Regulatory Issue Summary (RIS) 2015-07, "Process for Scheduling and Allocating Resources in FY 2017 for the Review of New Licensing Applications for Large Light-Water Reactors and Small Modular Reactors." In part, the subject RIS states that the NRC is seeking new or updated information on schedules for submitting certain applications and on the status of a variety of licensing and design-related activities for small reactors.

The purpose of this letter is to provide the combined response of NuScale, LLC (NuScale) and Utah Associated Municipal Power Systems (UAMPS) to RIS 2015-07. NuScale and UAMPS recognize the value in maintaining vendor-customer alignment in ensuring the effective implementation of the NRC's regulatory processes. This combined response includes the current status of the design, analyses, testing, licensing, and project planning for both the NuScale scalable Small Modular Reactor (SMR) Design Certification Application (DCA) and the planned UAMPS Combined Operating License Application (COLA).

Enclosure 1 to this letter provides the "NuScale Power, LLC and Utah Associated Municipal Power Systems Combined Response to NRC Regulatory Issue Summary 2015-07."

This letter makes no regulatory commitments and no revisions to any existing regulatory commitments.

Please feel free to contact Zackary Rad, NuScale Licensing Manager, at 980-349-3841 or at zrad@nuscalepower.com if you have any questions.

Sincerely,



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Enclosure 1: "NuScale Power, LLC and Utah Associated Municipal Power Systems Combined
Response to NRC Regulatory Issue Summary 2015-07," nonproprietary version



Enclosure 1 to
LO-0515-14681

Enclosure 1:

NuScale Power, LLC and Utah Associated Municipal Power Systems Combined Response to NRC
Regulatory Issue Summary 2015-07, Nonproprietary

NuScale Power, LLC and Utah Associated Municipal Power Systems Combined Response to NRC Regulatory Issue Summary 2015-07

On May 11, 2015 the NRC published NRC Regulatory Issue Summary (RIS) 2015-07, "Process for Scheduling and Allocating Resources in FY 2017 for the Review of New Licensing Applications for Large Light-Water Reactors and Small Modular Reactors." In part, the subject RIS states that the NRC is seeking new or updated information on schedules for submitting certain applications and on the status of a variety of licensing and design-related activities for small reactors.

The following information is provided by NuScale, LLC (NuScale) and Utah Associated Municipal Power Systems (UAMPS) in response to RIS 2015-07. NuScale and UAMPS recognize the value in maintaining vendor-customer alignment in ensuring the effective implementation of the NRC's regulatory processes. This combined response includes the current status of the design, analyses, testing, licensing, and project planning for both the NuScale scalable SMR Design Certification Application (DCA) and the prospective UAMPS Combined License Application (COLA).

The following responses include information related to ongoing NuScale DCA project activities and UAMPS COLA activities respectively.

Questions for all potential/future applicants

1. In which month and year do you expect to submit your application?

Response:

NuScale plans to submit a DCA for the NuScale scalable SMR plant design no later than December 31, 2016 with the current plan showing two months of schedule float.

UAMPS plans to submit a COLA referencing the NuScale plant design in the 4th quarter of 2017 or by the end of the 1st quarter of 2018, depending on the compilation of site characterization data necessary for the submittal of a complete COLA. UAMPS intends to provide updated schedule information to the NRC as it becomes more developed. UAMPS also plans to engage the NRC to schedule pre-application meetings to discuss plans for the COLA in the near future.

2. What type of permit, license, approval, amendment, or certification (CP, DC, ESP, COL, SDA, ML, LA request, or purchasing-approval request) would you be seeking?

Response:

NuScale will submit a DCA, for the NuScale scalable SMR plant design, seeking NRC approval and Design Certification (DC) of the design in accordance with 10 CFR Part 52.

UAMPS plans to submit a COLA, referencing the NuScale plant design, seeking NRC approval and issuance of a Combined License (COL) in accordance with 10 CFR Part 52.

Questions for potential/future nuclear power plant applicants

3. Which designs will you be using?

Response:

As noted above, NuScale will submit a DCA for the NuScale scalable SMR plant design and UAMPS will submit a COLA referencing the NuScale scalable SMR plant design.

4. Where will the plant be located?

Response:

UAMPS is in the initial stages of site selection and is evaluating potential sites in Idaho, including on property within the Idaho National Laboratory (INL) complex.

5. How many units will the plant contain?

Response:

The NuScale scalable SMR plant design to be included in the noted DCA will contain up to twelve (12) separate units (reactor modules) in a single reactor building.

The UAMPS COLA is expected to include one NuScale scalable SMR plant which will contain up to twelve (12) separate units (reactor modules) in a single reactor building.

6. What is the current status of the development of the plant design (i.e., conceptual, preliminary, or final)?

Response:

NuScale has established a detailed and comprehensive schedule for completing the work needed to support a high-quality DCA. The plant design has progressed to preliminary-to-detailed design stage. Reactor Module, Core and Primary Systems are 70-80% complete and Balance of Plant systems are 40-50% complete in the design effort required to support the design certification. Initial numeric revision (Rev 0) drawings of the Reactor Module have been issued.

UAMPS intends to reference the NuScale scalable SMR plant design. Design activities in support of the UAMPS COLA are currently at the conceptual stage.

7. Have you established a schedule for completing the design? If so, please describe the schedule.

Response:

Yes. NuScale has established a detailed and comprehensive schedule for completing the design work needed to support a high-quality DCA. The schedule is resource loaded by a work breakdown structure using Primavera P6 software. Durations, resources and costs are budgeted at the deliverable level and rolled up to control accounts by discipline. All design activities are progressively linked to the respective sections of DCA production creating a critical path to submittal of the DCA. Milestones have been established at varied levels of the work breakdown schedule leading up to DCA submittal. In-progress activities and milestones are assessed on a weekly basis. Completion of the design for select systems begins in the third quarter of 2015 and continues through the second quarter of 2016. Preparation of the application is done concurrently with the applicable portions of the design.

UAMPS intends to reference the NuScale scalable SMR plant design. Design activities in support of the UAMPS COLA are currently at the conceptual stage. UAMPS intends to provide more detailed information to the NRC when the schedule becomes more developed.

8. Will you be part of an organized Design-Center Working Group (DCWG)?

Response:

Yes. NuScale and UAMPS fully support, and plan to use, the Design Centered Working Group (DCWG) approach described in RIS 2006-06, *New Reactor Standardization Needed to Support the Design-Centered Licensing Review Approach*. NuScale is currently in the preliminary stages of DCWG implementation. The NuScale DCWG will be fully established in an adequate time frame to effectively support NRC review of the NuScale DCA. As a precursor to a DCWG, NuScale organized and regularly confers with an advisory board to obtain owner-operator input and perspective on current design and licensing matters.

9. Who are the other members of the DCWG?

Response:

NuScale is currently in the preliminary stages of DCWG implementation and has not yet established official membership. Current plans include NuScale as the design vendor, and UAMPS as a COL applicant. The Reference COL (R-COL) and potential Subsequent COL (S-COL) applicants who intend to reference the NuScale scalable SMR plant design will be added to the DCWG as they are identified.

10. Who will be the primary point of contact for each DCWG?

Response:

Currently, NuScale will be the primary point of contact for the NuScale DCWG (Zackary Rad, NuScale Licensing Manager, 980.349.4813, zrad@nuscalepower.com).

11. Have you developed protocols to provide coordinated responses to the NRC's requests for additional information with generic applicability to a design center?

Response:

No. As noted above, the NuScale DCWG is currently in the preliminary stages of DCWG implementation. Protocols to provide coordinated responses to the NRC's requests for additional information (RAIs) with generic applicability to a design center will be established in a time frame to support NRC review of the NuScale DCA.

12. Who will be designated as the reference COL applicant? In what order would you like the NRC to review the subsequent applications?

The Reference COL (R-COL) and potential Subsequent COL (S-COL) applicants who intend to reference the NuScale scalable SMR plant design will be added to the DCWG as they are identified.

13. Are vendors or consultants assisting you in preparing the application(s)? If so, please describe their roles and responsibilities for the design and licensing activities.

Response:

Yes. Vendors and consultants are supporting NuScale's design and licensing activities. Organizations with significant involvement in these activities include Fluor Corporation (engineering services), Rolls-Royce (engineering, manufacturing and miscellaneous project support), Oregon State University (testing), ARES Corporation (structural design), AREVA (nuclear fuel design and testing), SIET (steam generator testing), Curtiss-Wright (CRDM and valve design), Rock Creek Technologies (instrumentation and controls design), Konecranes (heavy lift equipment design), Dresser Rand (steam turbine design), Precision Custom Components (reactor module design support), and ENERCON Services (engineering and licensing support). In addition, there are numerous specialty consultants and engineers supporting analysis and evaluation of the design.

UAMPS has engaged vendors and consultants to assist in COLA-related activities, including site-selection and site characterization activities. UAMPS has also entered into a teaming agreement with NuScale and Energy Northwest (ENW) in support of the UAMPS COLA project.

14. Have you established a schedule for qualifying fuel and other major systems and components?

Response:

Yes. NuScale has developed a comprehensive reactor qualification test plan that identifies and describes the test programs being planned and executed in support of the design and commercialization of the NuScale reactor. The test programs are in various stages of the technology maturation process. NuScale provided an update to the fuels testing program during a March 19, 2015 pre-application meeting with the NRC. The fuel design and qualification work are now under contract to AREVA; testing is currently underway and projected to be complete within six months. Other test program status will be communicated through the regular interactions between NuScale and the NRC.

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15. Have you developed computer codes and models to perform design and licensing analyses?

Response:

Yes. NuScale has developed its own proprietary thermal-hydraulic system analysis code, NRELAP5, based on INL's RELAP5-3D. NRELAP5 contains NuScale specific models, correlations and features that are applicable to LOCA, non-LOCA and design analyses. Development of NRELAP5 is complete and acceptance testing and code validation is in progress and will be complete in 2015. Validation of NRELAP5 and associated plant models is being achieved through post-test assessments of NuScale's proprietary thermal-hydraulic tests in conjunction with assessments of historical thermal-hydraulics tests used to validate other system analysis codes. NuScale test programs that will be used for validation include integral systems tests conducted at the OSU NIST-1 facility, steam generator tests conducted at SIET Laboratory, and fuel CHF tests conducted at Stern Laboratory.

16. Have you defined principal design criteria, licensing-basis events, and other fundamental design and licensing relationships?

Response:

Yes. Principal design criteria and licensing basis events have been identified considering regulatory guidance with modifications that are appropriate for the NuScale design. A classification of transients and accidents for the NuScale SMR was submitted to the NRC in September 2013. NuScale recently completed an update to this report resulting in some minor changes to the classification of several design basis events. Fundamental design and licensing relationships have been established and are being tracked and, where necessary, are updated to ensure rigorous configuration management is maintained.

17. Have you established a schedule for completing the design and licensing analyses?

Response:

Yes. NuScale has established a detailed and comprehensive schedule for completing the design and licensing analysis needed to support a high-quality DCA. The design and licensing analysis schedule is consolidated in one schedule with the design scope of work as discussed in NuScale's response to question #2. Completion of the design and licensing analysis is done concurrently with the applicable portions of the design. An initial draft of the DCA has been completed. Refinement of the DCA documents will continue through the second quarter of 2016 leading into final reviews prior to submittal in the fourth quarter of 2016.

UAMPS COLA-related activities are in the preliminary planning stages. A preliminary schedule for completing COLA-related design activities has been developed and is in the review process. UAMPS intends to provide such schedule information to the NRC as it becomes more developed.

18. Have you developed procedures regarding the use of thermal fluidic testing facilities and regarding the use of the results of their tests to validate computer models? Have you established a schedule for the construction of testing facilities? Have you established a schedule for completing the thermal fluidic testing?

Response:

Yes. Thermal-fluidic testing is just one part of a comprehensive reactor qualification test plan that identifies and describes the test programs being planned and executed in support of design certification and commercialization of the NuScale scalable SMR. NuScale has developed plans and procedures regarding the use of data obtained from these thermal-fluidic tests for code and model validation purposes. This includes the use of data from NuScale's proprietary thermal-fluidic tests (integral systems tests conducted at the OSU NIST-1 facility, steam generator tests conducted at SIET Laboratory, fuel CHF tests conducted at Stern Laboratory, and AREVA) and historical thermal-fluidic tests used to validate other system analysis codes. Construction of all thermal-fluidic tests that support NuScale's design certification is complete. Thermal-fluidic testing that supports design certification is also complete, except for integral testing at the OSU NIST-1 facility where testing is in progress. A detailed schedule for the completion of NIST-1 testing has been developed and is regularly updated and communicated to the NRC to coordinate visits and inspection related activities. All testing at the NIST-1 facility that supports NuScale's design certification application will be complete in 2015.

19. Have you identified system and component suppliers (including fuel suppliers), manufacturing processes, and other major factors that could influence design decisions? Have you established a schedule for identifying suppliers and key contractors?

Response:

NuScale continues to utilize system and component suppliers to perform design work in areas such as the reactor module, steam generator, control rod drive mechanisms, steam turbines, heavy lifting equipment, critical valves, I&C safety equipment, reactor building, and nuclear fuel. At this point in the design certification process, we do not expect to add any more suppliers for major components to the design team.

UAMPS COLA-related activities are in the preliminary planning stages. Detailed planning for component suppliers (including fuel suppliers) and/or manufacturing processes has not yet been developed. UAMPS intends to provide such information to the NRC as it becomes more developed.

20. Do you have a quality-assurance program?

Response:

Yes. NuScale has developed a Quality Assurance Program Description (QAPD) for design certification of the NuScale reactor. The final safety evaluation (SE) approving the NuScale QAPD was issued by the NRC in May 2012, and NuScale published the accepted version in August 2012. A recent revision to this plan was submitted on May 20, 2015 for NRC review and approval.

The teaming agreement with ENW provides for the implementation of the necessary provisions of the ENW QAP for quality related items and activities for the UAMPS COLA. Certain site-specific activities may also be conducted under vendor quality assurance programs. At this point, UAMPS has not developed an independent nuclear quality-assurance program.

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- 21. Have you developed probabilistic risk assessment (PRA) models needed to support your applications, including the information needed to support risk-informed licensing approaches (for Chapter 19)? Do you plan to use the PRA for any risk-informed applications (e.g., risk-informed technical specifications, risk-informed in-service inspection, risk-informed categorization and treatment, risk-informed in-service testing, etc.)? Do you plan to use the PRA models in the development of the design? At what level will the PRA be prepared, and at what point during the application process will it be submitted?**

Response:

Yes. NuScale maintains a PRA consistent with the NuScale design and the scope of the NuScale DCA. The NuScale PRA is focused on the level-1 full-power internal-events modeling. The PRA includes level-2, low-power and shutdown operating modes, seismic, internal fire, and internal flood models. It is NuScale's plan to have available for NRC review a full-scope, all operating modes, level-2 PRA at the time the NuScale DC application is submitted. A level-3 portion of the PRA will be done to support the severe accident management design alternatives (SAMDA) analysis needed for the environmental report that is needed for the DCA.

The results of the PRA are periodically published and distributed internally at NuScale. The PRA has been used to risk-inform several design decisions and is used as input to NuScale's design reliability assurance program (D-RAP).

- 22. Have you developed the plans for the construction and use of a control-room simulator?**

Response:

In 2010, NuScale developed and began operating a single module engineering simulator to support system design. Subsequently, the simulator was expanded to a multi-module (12-reactor) control room to support human factors and human-machine interface development. Initial operation of the multi-module control room simulator began in May 2012, and will continue in support of both DCA and COLA development. In 2013, the underlying thermal-hydraulic model was updated to reflect the current NuScale module design, and a software package was developed to speed prototyping HSI (Human System Interface) screens. The control room simulator is used in support of the plant staffing and human factors engineering analysis programs. The simulator provides the foundation for developing station operating procedures, automation concepts, alarm management techniques, HSI designs, multi-module operating strategies, scenario simulations, and operator training programs.

UAMPS has not yet developed plans for the construction and use of a control-room simulator. UAMPS intends to provide further information to the NRC as such plans are developed.

- 23. Do you have a staffing plan?**

Response:

Yes. NuScale is currently executing a staffing plan, consistent with integrated schedule requirements, which supports development and submittal of the NuScale scalable SMR plant design DCA. Current plans indicate peak staffing levels of 302 full-time staff, as well as up to 209 full-time equivalent staff working on the project as contractors and staff augmentation personnel.

As noted above, UAMPS has developed a preliminary schedule for completing COLA-related activities which is currently in the review process. As this schedule is refined UAMPS plans to develop a staffing plan which supports the completion of scheduled activities.

24. What is your current staffing level for the execution and testing of the reactor design?

Response:

NuScale currently employs approximately 249 full-time staff, as well as up to 172 full-time equivalent staff working on the project as contractors and within our suppliers' organizations. These levels vary as a function of integrated schedule requirements.

25. Do you plan to increase staffing?

Response:

The NuScale and UAMPS staffing plans to increase staffing are addressed in response to question number twenty three (23).

26. Do you plan to submit white papers or technical and topical reports related to the features of your design or for the resolution of policy or technical issues? Do you have a schedule for submitting such reports?

Response:

Yes. NuScale and UAMPS plan to submit white papers and technical and topical reports related to features of the NuScale plant design and for resolution of policy and technical issues.

NuScale has submitted over forty (40) white papers or technical and topical reports to the NRC for review as part of the pre-application project. NuScale currently plans to submit additional reports and white papers during the pre-application phase in order to receive feedback from the NRC or to facilitate pre-application discussions on NuScale-unique features. NuScale has held over sixty (60) pre-application meetings or workshops and intends to request additional pre-application meetings or workshops with the NRC staff on various subjects. NuScale has a schedule for anticipated interactions and submittal of such reports, elements of which were shared with the NRC in correspondence dated May 30, 2014 and October 20, 2014, and most recently during a meeting with the NRC staff on April 21, 2015. NuScale intends to provide an update to this schedule in the near term. Additional discussions and meetings are ongoing and are intended to establish agreement with NRC on a final set of pre-application interactions, and topical and technical reports.

UAMPS COLA-related activities are in the preliminary planning stages and a schedule for submitting any such reports has not yet been developed. At this time, UAMPS has not identified any white papers or technical and topical reports related to the features of the design or for the resolution of policy or technical issues to submit to the NRC. UAMPS will inform the NRC if this information changes.

27. Do you plan to request an ESP? If so, will you seek approval of either proposed major features of the emergency plans in accordance with 10 CFR 52.17(b)(2)(i) or with 10 CFR 52.17(b)(2)(ii)?

Response:

No. NuScale does not intend to request an ESP.

UAMPS currently has not developed plans to request an ESP, but will inform the NRC if this information changes.

28. Will you use the provisions in Subpart F, "Manufacturing Licenses," of 10 CFR Part 52, instead of, or in combination with, other licensing approaches (e.g., a DC or SDA)?

Response:

No. Neither NuScale nor UAMPS intend to use the provisions in Subpart F, "Manufacturing Licenses," of 10 CFR Part 52, instead of, or in combination with, other licensing approaches.

29. What is the desired scope of your possible ML?

Response:

As noted above, neither NuScale nor UAMPS intend to use the provisions in Subpart F, "Manufacturing Licenses," of 10 CFR Part 52, instead of, or in combination with, other licensing approaches.

30. What design or licensing process would address the remainder of the proposed nuclear power plant? For example, would the ML address an essentially complete plant or would it be limited to the primary coolant system that basically comprises the integral reactor vessel and internals?

Response:

As noted above, neither NuScale nor UAMPS intend to use the provisions in Subpart F, "Manufacturing Licenses," of 10 CFR Part 52, instead of, or in combination with, other licensing approaches.

31. Which systems, structures, and components are being fabricated and delivered for the manufacturing, fabrication, and site construction of a completed operational nuclear power plant?

Response:

NuScale maintains a construction planning program that will integrate manufacturing, fabrication, and site construction to support COL applicant project planning. Based on current plans, NuScale expects that module subassemblies, upper containment (which includes upper reactor vessel including SGs and pressurizer), a lower containment pressure vessel, and a lower reactor vessel, will be manufactured and delivered to the site for final assembly. These reactor module subassemblies will be installed after reactor building construction is completed.

32. What is being assembled and constructed on site?

Response:

The detailed planning to determine which equipment will be fabricated and delivered and which will be assembled on-site is currently under development. Plant buildings and structures will be constructed on-site using a combination of in situ and prefabricated component construction.