October 15, 2009

MEMORANDUM TO: Stewart Magruder, Branch Chief
Advanced Reactor Branch 2
Advanced Reactor Program
Office of New Reactors

FROM: Thomas J. Kenyon, Senior Project Manager ***/RA/***
Advanced Reactor Branch 2
Advanced Reactor Program
Office of New Reactors

SUBJECT: SUMMARY OF PRE-APPLICATION MEETING WITH NUSCALE POWER INC. TO DISCUSS SOURCE TERM AND SEVERE ACCIDENT ANALYSIS, AND THE PROBABILISTIC RISK ASSESSMENT FOR THE NUSCALE REACTOR DESIGN

On September 2, 2009, staff from the U.S. Nuclear Regulatory Commission (NRC) met with representatives from NuScale Power, Inc. (NuScale) to discuss source term and severe accident analysis and preliminary results of the probabilistic risk assessment (PRA). Enclosures 1 and 2 are the meeting agenda and attendees, respectively.

The meeting opened with a brief presentation on the NuScale Power reactor design and NuScale's proposal for future interactions. In its letter dated August 12, 2009, NuScale submitted both non-proprietary and proprietary versions of the slide presentations for this meeting. Non-proprietary versions of NuScale's slide presentations can be obtained from the Commission's Public Document Room, at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland. They are also available electronically from the Public Electronic Reading Room found on the Internet at the following web address: http://www.nrc.gov/reading-rm.html. From this site, the public can gain access to the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents in the Publicly Available Records component of ADAMS. The ADAMS accession numbers for the non-proprietary versions of the slide presentations are ML092810329. The non-publicly available proprietary slide presentations can be found at ML092810331.

NuScale opened the meeting discussing its proposal for future interactions with the staff during the pre-application review. The designer indicated that it was planning to submit several licensing topical reports on codes and testing, control room design, and source term studies, and requested that a limited number of staff meet with them to focus on specific topics.

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The NRC reminded NuScale that resources for pre-application review activities were limited, and that meetings and pre-application interactions had to be conducted in a non-resource-intensive manner. NuScale then described the NuScale Power reactor, stating that it is a small light-water reactor in which each reactor module employs natural circulation to develop the heat source for producing about 45 MWe using a turbine-generator for each module. The pre-applicant noted that some of the design parameters provided in previous meetings have been evolving during the optimization of the design. The NuScale design consists of a self-contained assembly with the reactor core and steam generators located in a common containment vessel that is immersed in a large pool of water. The pool could be designed to accommodate multiple power generating modules (the example shown in NuScale's slide presentation was for 12 modules, but that number can be expanded or reduced). The pre-applicant then briefly described other unique features of the facility, such as a 72-hour capacity in the pool to handle the decay heat of a single module without boiling.

NuScale then discussed the design goals it was working toward to address source term and severe accident issues. The pre-applicant was using both deterministic and probabilistic risk assessments to identify and evaluate improvements in design features and address man-machine interface concerns to ensure that the NuScale design offered adequate redundancy, diversity, and independence with sufficient defense-in-depth and safety margins. NuScale discussed its Phase I high-level severe accident evaluation and the results of its phenomena identification and ranking activities. The designer further discussed its approach to the Phase II detailed evaluations that will be conducted to support the NuScale licensing application. NuScale then described the PRA methods and guidance that it was using to develop its internal events assessment and described some of its preliminary results of its single-module Level 1 PRA, low power and shutdown PRA, and internal fire assessment. The pre-applicant indicated that it was also conducting a limited-scope seismic hazards analysis. NuScale then discussed its planned approach to developing a multi-module Level 2 PRA.

In the next presentation, NuScale discussed preliminary results of its design basis source term analysis, describing its overall approach and assumptions. The pre-applicant indicated that the NuScale design offered certain advantages over large light-water reactor designs because of the small core, lower power density, longer time to core damage, and elimination of the large break loss-of-coolant accident. The designer stated that the preliminary results from its design basis analysis indicated that releases, should one occur, would be within regulatory requirements. NuScale proposed that the source term for a single module should be considered for its licensing basis dose calculations

The staff indicated that it had concerns with this approach, as there could be failure paths common to more than one module. NuScale indicated that it would address such issues.

Enclosures:
As stated

Project No. 0769

cc w/enclosures: See next page

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DATE	10/13/2009	10/15/2009

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Meeting Agenda
Meeting on Source Term and Severe Accident Analysis,
and Use of Probabilistic Risk Assessment
NuScale Reactor Design

Wednesday, September 2, 2009, 8:30 a.m. – 2:30 p.m.
NRC Headquarters (Room O-03 B04)

TIME	TOPIC	LEAD
The following discussions will be open to the public.		
8:30 a.m. - 8:45 a.m.	Introduction and Opening Remarks	NRC/NuScale
8:45 a.m. – 9:15 a.m.	Design Overview	NuScale
9:15 a.m. – 9:40 a.m.	Use of PRA and Severe Accident Analyses	NuScale
9:40 a.m. – 9:50 a.m.	Opportunity for Public Comment	All
9:50 a.m. – 10:00 a.m.	Concluding Remarks	NRC/NuScale
10:00 a.m.	Adjourn Public Portion of Meeting	
10:00 a.m. – 10:10 a.m.	BREAK	
The following sessions will be closed to the public because proprietary information will be discussed.		
10:10 a.m. – 11:00 a.m.	Level I Internal Events PRA	NuScale
11:00 a.m. – 12:00 p.m.	Severe Accident Phenomena	NuScale
12:00 p.m. – 01:00 p.m.	LUNCH	
01:00 p.m. – 01:20 p.m.	Internal Fire and Low Power/Shutdown PRAs	NuScale
01:20 p.m. – 01:50 p.m.	Level II PRA and Multi-Module Risk	NuScale
01:50 p.m. – 2:15 p.m.	Application of Alternative Source Term	NuScale
02:15 p.m. – 02:30 p.m.	Concluding Remarks	NRC/NuScale
02:30 p.m.	Adjourn	

Enclosure 1

Meeting Attendees
Pre-Application Meeting on Source Term and Severe Accident Analysis, and Use of Probabilistic Risk Assessment
NuScale Reactor Design
September 2, 2009

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