

July 29, 2014

Docket: PROJ0769

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

SUBJECT: NuScale Power, LLC Submittal of the Updated NuScale MELCOR Model Data (NRC Project No. 0769)

REFERENCES: "Information Request for the Purpose of Updating the MELCOR Models for Simulation of Accidents in the NuScale Design and Assessment of NuScale Integral Effects Test Facility" dated May 8, 2014

NuScale Power, LLC (NuScale) hereby submits updated MELCOR model data as requested by the U.S. Nuclear Regulatory Commission (NRC). Though this updated model data represents the current NuScale nuclear module design, the NuScale design is still in development and should not be considered final. NuScale would appreciate the opportunity to discuss this submission with the NRC at its convenience during a future teleconference if there are questions about these data.

Enclosure 1 is the proprietary, export controlled information version of this response. Enclosure 2 is the nonproprietary version of the response. NuScale requests that the proprietary, export controlled information version be withheld from public disclosure in accordance with the requirements of 10 CFR § 2.390(a)(4). The enclosed affidavit (Enclosure 3) supports this request.

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

Sincerely,



Steven Mirsky
Manager, Licensing

Distribution: Anna Bradford, NRC, TWFN-9 F27
Greg Cranston, NRC, TWFN-9 F27
Michael Mayfield, NRC, TWFN-6 E04

Enclosure 1: "NuScale Power Response to Information Request for the Purpose of Updating the MELCOR Model," proprietary version

Enclosure 2: "NuScale Power Response to Information Request for the Purpose of Updating the MELCOR Model," nonproprietary version

Enclosure 3: Affidavit, AF-0614-7424

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928

www.nuscalepower.com



Enclosure 1 contains ECI and will not be added to ADAMS

DIII
NRD

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

This report was prepared as an account of work sponsored by an agency of the United States (U.S.) Government. Neither the U.S. Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the U.S. Government or any agency thereof.

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

**NuScale Power Response to Information Request for the Purpose of Updating the
MELCOR Model**

1. *Please provide the axial and radial power profiles at the beginning of cycle and the middle of cycle for an equilibrium cycle.*

Response:

{{

}}^{3(a)}

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

{{

}}^{3(a)}

2. *Is the region between the core and the core barrel (i.e., core bypass region) filled with perforated solid materials? If yes, please provide the number of holes that are present and their associated diameters and locations. In addition, please provide the detailed geometry and the total mass of the structures in this region.*

Response:

{{

}}^{3(a)}

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

{{

}}^{3(a)}

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

{{

}}^{3(a)}

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

{{

}}^{3(a)}

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

3. For the decay heat removal system (DHRS), please provide the:
- a. Maximum heat capacity of one DHRS under design conditions,

Response:

{{ }}^{3(a)}

- b. Capacity of one DHRS as a function of the pressure inside the tubes in DHRS,

Response:

{{

}}^{3(a)}

- c. Capacity of one DHRS as a function of non-condensable mole fraction in the DHRS at reactor bay pool temperature of 323 K, and

Response: This information has not yet been developed

- d. Capacity of one DHRS as a function of non-condensable mole fraction in the DHRS at reactor bay pool temperature of 373 K.

Response: This information has not yet been developed

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

4. Please provide the inner and outer diameters of the control rod guide tubes (CRGT).

Response:

{{
}}^{3(a)}

5. Please provide the thickness of the upper core plate.

Response:

{{
}}^{3(a)}

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

6. Please provide the detailed geometry information for the:
- a. Upper head (e.g., shape), and
 - b. Lower head.

Response:

{{

-

}}^{3(a)}

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

{{

}}^{3(a)}

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

{{

}}^{3(a)}

7. *Please provide the diameter and number of support columns in the region between the core and the riser section.*

Response:

There are no support columns

8. *Please provide the outside diameter of the CRGT.*

Response

See Question 4

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

9. Please provide the elevation of the bottom of the CRGT relative to the top of the lower core plate.

Response

{{ }}^{3(a)}

10. Please provide the elevation of the top of the CRGT relative to the bottom of the upper core plate.

Response

{{ }}^{3(a)}

11. Please provide the number of control rod drive mechanisms.

Response:

16 CRDMs

12. Please provide the form loss coefficient:

- a. At the exit of the core bypass region,

Response:

From RELAP5 abrupt area change model

{{ }}^{3(a)}

- b. In the region between the core and the hot leg riser,

Response:

{{ }}^{3(a)}

- c. In the core in the horizontal direction,

Response:

K factor form loss coefficients correlate to MELCOR Model

{{ }}^{3(a)}

- d. In the hot leg riser, and

Response:

From RELAP5 abrupt area change model

{{ }}^{3(a)}

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

e. *At the exit of the hot leg riser*

Response:

RELAP5 Form Loss Calculation

{{
}}^{3(a)}

13. *Please provide the emissivity for the outside surface of the:*

- a. *Reactor pressure vessel wall based on the design conditions, and*
- b. *Reactor pressure vessel upper and lower head under design conditions.*

Response:

{{
}}^{3(a)}

14. *Please provide the wall thickness of the steam generator steam header.*

Response:

{{
}}^{3(a)}

15. *Please provide the material and density of the grid spacer.*

Response:

{{

}}^{3(a)}

16. *Please provide the density of the B₄C absorber material.*

Response:

The information has not yet been determined.
Default values currently used are 1.76g/cm³

17. *Please provide the elevation corresponding to the top of the reactor bay pool relative to the bottom of the reactor bay pool.*

Response:

This information has not yet been determined.

18. *Please provide the design temperature of the reactor bay pool.*

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

Response:

This information has not yet been fully developed.
Operating expected to be ~100F with alarm limits between 110F and 120F
Maximum allowed temperature will be 140F

19. *Regarding the design data for the NuScale IET facility, please provide the:*
- a. Engineering design of each component of the IET Facility,*
 - b. Design of instrumentation (i.e., location and type of measurements),*
 - c. Testing procedure,*
 - d. Detailed test parameters, and*
 - e. Details of the measured parameters, including the initial test conditions.*

Response:

This information has not yet been fully developed

NuScale Nonproprietary

NuScale Power, LLC

1100 NE Circle Blvd., Suite 200 Corvallis, Oregon 97330 Office 541.360-0500 Fax 541.207.3928
www.nuscalepower.com

NuScale Power, LLC

AFFIDAVIT of José N. Reyes, Jr.

STATE OF OREGON

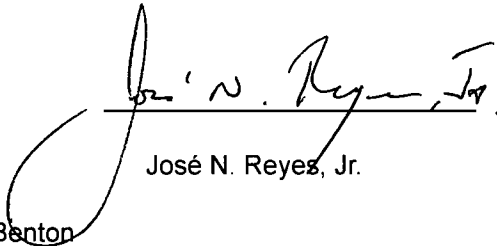
CITY OF CORVALLIS

I, José N. Reyes, Jr., state as follows:

- (1) I am the Chief Technology Officer of NuScale Power, LLC (NuScale), and as such I am authorized to apply for withholding of information transmitted with this letter from public disclosure and to execute this affidavit on behalf of NuScale.
- (2) I am knowledgeable of the criteria and procedures used by NuScale in designating confidential commercial information as proprietary and have been specifically delegated the function of reviewing the information described in this affidavit that NuScale seeks to have withheld from public inspection.
- (3) The harm that would result if the information sought to be withheld is disclosed to the public is as follows:
 - (a) The report discloses information about the components, structures, and methods by which NuScale develops a MELCOR model to simulate severe accident scenarios. NuScale has performed significant research and evaluation to develop a basis for these components, structures, and methods and has invested significant human and financial resources in such development.
 - (b) NuScale's unique process, component, structure, tool, method, or other trade secrets provide NuScale with a competitive economic advantage over other companies. Public disclosure of the information would cause substantial harm to NuScale's competitive position and reduce or foreclose opportunities for NuScale to generate a return on its investment in research and development. Although the exact financial value of the information is difficult to quantify, it is a key element of the design basis for a NuScale plant and, therefore, has substantial value to NuScale.
 - (c) If the information were disclosed to the public, NuScale's competitors would have access to the information without having been required to undertake a similar expenditure of resources. Such disclosure would constitute a misappropriation of NuScale's intellectual property, would unfairly provide NuScale's competitors with a windfall, and would deprive NuScale of the opportunity to seek an adequate return on its investment.
- (4) The information sought to be withheld is contained in the enclosure to NuScale letter from Steven Mirsky, dated July 29, 2014, to the NRC, NuScale Power, LLC Submittal of the Updated NuScale MELCOR Model Data (NRC Project No. 0769). The enclosure, LO-0614-7396, contains the designation "NuScale Confidential - Proprietary Class 2" at the top of each page. The information considered by NuScale to be proprietary is identified within double braces, "{{ }}" in the document.
- (5) The basis for proposing that the information be withheld is that NuScale treats the information as trade secrets and commercial or financial information that are privileged and confidential. NuScale relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC § 552(b)(4), as well as exemptions applicable to the NRC under 10 CFR §§ 2.390(a)(4) and 9.17(a)(4).
- (6) With respect to the considerations set forth in 10 CFR § 2.390(b)(4):

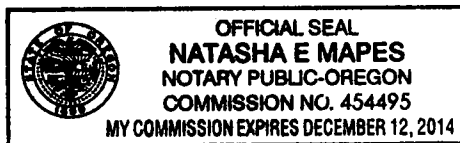
- (a) The information sought to be withheld has been held in confidence by NuScale.
- (b) The information is of a sort customarily held in confidence by NuScale and, to the best of my knowledge and belief, consistently has been held in confidence by NuScale. The procedure for approval of external release of such information typically requires review by the staff manager, project manager, chief technology officer or other equivalent authority, or the manager of the cognizant marketing function (or his delegate), for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside NuScale are limited to regulatory bodies, customers and potential customers and their agents, suppliers, licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or contractual agreements to maintain confidentiality.
- (c) The information is being transmitted to and received by the NRC in confidence.
- (d) No public disclosure of the information has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or contractual agreements that provide for maintenance of the information in confidence.
- (e) Public disclosure of the information is likely to cause substantial harm to the competitive position of NuScale, taking into account the value of the information to NuScale, the amount of effort and money expended by NuScale in developing the information, and the difficulty others would have in acquiring or duplicating the information. The information sought to be withheld is part of NuScale's technology that provides NuScale with a competitive advantage over other firms in the industry. NuScale has invested significant human and financial capital in developing this technology and NuScale believes it would difficult for others to duplicate the technology without access to the information sought to be withheld.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.


José N. Reyes, Jr.

State of Oregon, County of Benton

Subscribed and sworn to before me this 29 day of July 2014




Notary Public

My commission expires:

DECEMBER 12, 2014