May 16, 2019 Docket No. 52-048

U.S. Nuclear Regulatory Commission
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SUBJECT: NuScale Power, LLC Submittal of Changes to the "Pipe Rupture Hazards Analysis Technical Report," TR-0818-61384, Revision 1

REFERENCE: Letter from NuScale Power, LLC to Nuclear Regulatory Commission, "NuScale Power, LLC Updates to Final Safety Analysis Report, Section 1.6, "Materials Referenced," Section 3.6, "Protection Against Dynamic Effects Associated with Postulated Rupture of Piping," and the "Pipe Rupture Hazards Analysis," TR-0818-61384," dated March 28, 2019 (ML19087A288)

The referenced letter addressed inconsistencies, identified during the NRC Design Certification Application review, between the Final Safety Analysis Report, Section 1.6, "Materials Referenced," Section 3.6, "Protection Against Dynamic Effects Associated with Postulated Rupture of Piping," and the "Pipe Rupture Hazards Analysis Technical Report," TR-0818-61384, Revision 1.

In a subsequent follow-up communication on May 2, 2019, NRC requested a rewording of the text changes made to the "Pipe Rupture Hazards Analysis (PRHA) Technical Report," TR-0818-61384, Sections 4.2.1 and 4.2.3.

The Enclosure to this letter provides a mark-up of the PRHA technical report incorporating the text clarifications as requested, in redline/strikeout format. NuScale will include this change as part of a future revision to the NuScale PRHA technical report.

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

If you have any questions, please feel free to contact Marty Bryan at (541) 452-7172 or at mbryan@nuscalepower.com.

Sincerely,

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Changes to the “Pipe Rupture Hazards Analysis Technical Report,” TR-0818-61384, Revision 1

4.2 Blast Effects

Blast effects results are based on three-dimensional CFD analysis discussed in Appendix F.

4.2.1 In the Containment Vessel

Because only NPS 2 lines are postulated to break, the mass and energy release feeding the blast formation is small. Only the degasification line has the potential for forming a blast, because the other CVCS lines contain subcooled liquid. The magnitude of the blast wave pressures is low, and the maximum force imposed on any component is limited to 6,000 lbf. In addition, the load is of very short duration~~,~~ (a few milliseconds). Because the blast load is small, its effect on load combinations is inconsequential, and its exclusion does not affect compliance with the ASME allowable limits.~~and does not need to be included in load combinations.~~

4.2.2 In the NPM Bay under the Bioshield

Not applicable.

4.2.3 In the Reactor Building

Breaks are postulated in MSS lines at three locations in a pipe gallery. Only MSS lines have a potential for forming a blast, because the other CVCS lines contain subcooled liquid. The maximum force on any component is less than 10,000 lbf. Although a force of 103,000 lbf on the pool wall was calculated, it is distributed over a surface area with a radius of about 100 inches, yielding a momentary overpressure of less than 15 psig and no damage to the structure. ~~No damage occurs as a result, and the shortness of the loading eliminates the need to consider it in load combinations.~~ In addition, the load is of very short duration (a few milliseconds). Because the blast load is small, its effect on load combinations is inconsequential, and its exclusion does not affect compliance with the ACI 349 allowable limits.

4.3 Pipe Whip

Results of pipe whip evaluations are detailed in Appendix C.

4.3.1 In the Containment Vessel

Pipe whip for breaks at the RPV and CNV terminals ends has been evaluated. The nozzle/safe end end does not whip. For the piping end, the motion of the pipe is such that no safety-related or essential SSC are impacted. Even if an impact did occur, the SSC are of heavy wall construction so that they neither leak nor crack. There is one exception: the ECCS trip/reset line. If a whipping pipe strikes a trip/reset line, the line is severed, causing it to vent. This has the same effect as opening the trip valve and allows the ECCS main valve to open once the IAB clears. As the response to the HELB is ECCS initiation, the severance of a trip/reset line has no effect on response to the event.