

NUCLEAR REGULATORY COMMISSION

[NRC–2015–0160]

NuScale Power, LLC, Design-Specific Review Standard and Safety Review Matrix

AGENCY: Nuclear Regulatory Commission.

ACTION: Design-specific review standard; request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is soliciting public comment on the Design-Specific Review Standard (DSRS) and Safety Review Matrix for the NuScale Power, LLC, design (NuScale DSRS Scope and Safety Review Matrix). The purpose of the NuScale DSRS is to provide guidance to NRC staff in performing safety reviews where existing NUREG–0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition,” Standard Review Plans (SRP) have been modified by the staff specifically for the NuScale design, or do not address unique features of the NuScale design. The DSRS also allows NRC staff to more fully integrate the use of design-specific risk insights into the review of the NuScale design certification application (DC) or an early site permit (ESP) or combined license (COL) application that references the NuScale design.

DATES: Submit comments by August 31, 2015. Comments received after this date will be considered, if it is practical to do so, but the NRC is able to ensure consideration only for comments received on or before this date.

ADDRESSES: You may submit comments by any of the following methods (unless this document describes a different method for submitting comments on a specific subject):

- *Federal Rulemaking Web site:* Go to <http://www.regulations.gov> and search for Docket ID NRC–2015–0160. Address questions about NRC dockets to Carol Gallagher; telephone: 301–415–3463; email: Carol.Gallagher@nrc.gov. For technical questions, contact the individual listed in the **FOR FURTHER INFORMATION CONTACT** section of this document.

- *Mail comments to:* Cindy Bladey, Chief, Rules, Announcements, and Directives Branch (RADB), Office of Administration, Mail Stop: OWFN–12–H08, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001.

For additional direction on obtaining information and submitting comments, see “Obtaining Information and

Submitting Comments” in the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT:

Jenny Gallo, Office of New Reactors, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001; telephone: 301–415–7367; email: NuScale-DSRS@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Obtaining Information and Submitting Comments

A. Obtaining Information

Please refer to Docket ID NRC–2015–0160 when contacting the NRC about the availability of information regarding this document. You may obtain publicly-available information related to this action by any of the following methods:

- *Federal Rulemaking Web site:* Go to <http://www.regulations.gov> and search for Docket ID NRC–2015–0160.
- *NRC’s Agencywide Documents Access and Management System (ADAMS):* You may obtain publicly-available documents online in the ADAMS Public Documents collection at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select “ADAMS Public Documents” and then select “Begin Web-based ADAMS Search.” For problems with ADAMS, please contact the NRC’s Public Document Room (PDR) reference staff at 1–800–397–4209, 301–415–4737, or by email to pdr.resource@nrc.gov. The ADAMS accession number for each document referenced (if it is available in ADAMS) is provided the first time that it is mentioned in the **SUPPLEMENTARY INFORMATION** section. The NuScale DSRS Scope and Safety Review Matrix is available in ADAMS under Accession No. ML15156B063.

- *NRC’s PDR:* You may examine and purchase copies of public documents at the NRC’s PDR, Room O1–F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

B. Submitting Comments

Please include Docket ID NRC–2015–0160 in your comment submission.

The NRC cautions you not to include identifying or contact information that you do not want to be publicly disclosed in your comment submission. The NRC will post all comment submissions at <http://www.regulations.gov> as well as enter the comment submissions into ADAMS. The NRC does not routinely edit comment submissions to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for

submission to the NRC, then you should inform those persons not to include identifying or contact information that they do not want to be publicly disclosed in their comment submission. Your request should state that the NRC does not routinely edit comment submissions to remove such information before making the comment submissions available to the public or entering the comment into ADAMS.

II. Further Information

A. Background

In the Staff Requirements Memorandum (SRM) COMGBJ–10–0004/COMGEA–10–0001, “Use of Risk Insights to Enhance the Safety Focus of Small Modular Reactor Reviews,” dated August 31, 2010 (ADAMS Accession No. ML102510405), the Commission provided direction to the NRC staff on the preparation for, and review of, small modular reactor (SMR) applications, with a near-term focus on integral pressurized-water reactor designs. The Commission directed the NRC staff to more fully integrate the use of risk insights into pre-application activities and the review of applications and, consistent with regulatory requirements and Commission policy statements, to align the review focus and resources to risk-significant structures, systems, and components and other aspects of the design that contribute most to safety in order to enhance the effectiveness and efficiency of the review process. The Commission directed the NRC staff to develop a design-specific, risk-informed review plan for each SMR design to address pre-application and application review activities. An important part of this review plan is the DSRS. The DSRS for the NuScale design is the result of the implementation of the Commission’s direction.

B. DSRS for the NuScale Design

The NuScale DSRS reflects current NRC staff safety review methods and practices which integrate risk insights and, where appropriate, lessons learned from the NRC’s reviews of DC and COL applications completed since the last revision of the NUREG–0800, SRP Introduction, Part 2, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: Light-Water Small Modular Reactor Edition,” January 2014 (ADAMS Accession No. ML13207A315). The NuScale DSRS Scope and Safety Matrix provides a complete list of SRP sections and identifies which SRP sections will be used for DC, COL, or ESP reviews concerning the NuScale design; which SRP sections are not applicable to the

NuScale design; and which new DSRS sections are design-specific to NuScale. The NuScale DSRS Scope and Safety Review Matrix is available in ADAMS under Accession No. ML15156B063.

The NRC staff is soliciting public comment on the NuScale DSRS Scope and Safety Review Matrix and the individual NuScale-specific DSRS sections referenced in the table below. Specifically, the NRC requests comment

on the sufficiency of the scope of the proposed NuScale review, as encompassed by the Safety Review Matrix, and on the technical content of the individual NuScale-specific DSRS sections identified in the table below. These sections were revised from the relative SRP sections or developed to incorporate design-specific review guidance based on features of the NuScale design. The NRC is not

soliciting general comments on NUREG-0800 sections that are designated with the applicability "A) Use SRP Section" in the Safety Review Matrix, but specific comments on the adequacy of these NUREG-0800 sections for use in the review of the NuScale design certification application will be considered.

| Section | Design-specific review standard title | ADAMS Accession No. |
|-----------|--|---------------------|
| Matrix | NuScale Power, LLC DSRS Scope and Safety Review Matrix | ML15156B063 |
| 3.11 | Environmental Qualification of Mechanical and Electrical Equipment | ML15131A247 |
| 3.13 | Threaded Fasteners—ASME Code Class 1, 2, and 3 | ML15084A277 |
| 3.3.1 | Offsite Power System | ML15071A259 |
| 3.3.2 | Tornado Loads | ML15071A267 |
| 3.4.1 | Internal Flood Protection for Onsite Equipment Failures | ML15139A112 |
| 3.4.2 | Analysis Procedures | ML15071A324 |
| 3.5.1.1 | Internally Generated Missiles (Outside Containment) | ML15139A081 |
| 3.5.1.2 | Internally Generated Missiles (Inside Containment) | ML15139A096 |
| 3.5.1.3 | Turbine Missiles | ML15070A248 |
| 3.5.1.4 | Missiles Generated by Tornadoes and Extreme Winds | ML15139A121 |
| 3.5.2 | Structures, Systems, and Components to be Protected from Externally-Generated Missiles | ML15139A102 |
| 3.5.3 | Barrier Design Procedures | ML15071A273 |
| 3.7.1 | Seismic Design Parameters | ML15084A279 |
| 3.7.2 | Seismic System Analysis | ML15084A177 |
| 3.7.3 | Seismic Subsystem Analysis | ML15131A340 |
| 3.8.2 | Steel Containment | ML15131A373 |
| 3.8.4 | Other Seismic Category I Structures | ML15118A151 |
| 3.8.5 | Foundations | ML15132A186 |
| 4.2 | Fuel System Design | ML15132A517 |
| 4.3 | Nuclear Design | ML15125A374 |
| 4.4 | Thermal and Hydraulic Design | ML15131A427 |
| 4.5.2 | Reactor Internal and Core Support Structure Materials | ML15070A325 |
| 4.6 | Functional Design of Control Rod Drive System | ML15119A111 |
| 5.2.2 | Overpressure Protection | ML15118A931 |
| 5.2.4 | Reactor Coolant Pressure Boundary Inservice Inspection and Testing | ML15125A305 |
| 5.2.5 | Reactor Coolant Pressure Boundary Leakage Detection | ML15132A194 |
| 5.3.1 | Reactor Vessel Materials | ML15070A457 |
| 5.3.2 | Pressure-Temperature Limits, Upper-Shelf Energy, and Pressurized Thermal Shock | ML15070A468 |
| 5.3.3 | Reactor Vessel Integrity | ML15070A462 |
| 5.4 | Rx Coolant System Component and Subsystem Design | ML15126A156 |
| 5.4.2.1 | Steam Generator Materials | ML15131A376 |
| 5.4.2.2 | Steam Generator Program | ML15070A562 |
| 5.4.7 | Residual Heat Removal (RHR) System | ML15131A360 |
| 5-4 BTP | Design Requirements of the RHR System | ML15132A524 |
| 6.1.1 | Engineered Safety Features Materials | ML15070A567 |
| 6.1.2 | Protective Coating Systems (Paints)—Organic Materials | ML15071A372 |
| 6-1 BTP | pH for Emergency Coolant Water for PWRs | ML15125A369 |
| 6.2.1 | Containment Functional Design | ML15118A922 |
| 6.2.1.1.A | PWR Dry Containments, Including Sub-atmospheric Containments | ML15118A264 |
| 6.2.1.3 | Mass and Energy Release Analysis for Postulated Loss-of-Coolant Accidents (LOCAs) | ML15112A134 |
| 6.2.1.4 | Mass and Energy Release Analysis for Postulated Secondary System Pipe Ruptures | ML15118A293 |
| 6.2.2 | Containment Heat Removal Systems | ML15131A341 |
| 6.2.4 | Containment Isolation System | ML15119A087 |
| 6.2.5 | Combustible Gas Control in Containment | ML15119A090 |
| 6.2.6 | Containment Leakage Testing | ML15119A084 |
| 6.2.7 | Fracture Prevention of Containment Pressure Boundary | ML15112A517 |
| 6.3 | Emergency Core Cooling System | ML15125A322 |
| 6.6 | Inservice Inspection and Testing of Class 2 and 3 Components | ML15127A136 |
| 7.0 | Instrumentation and Controls—Introduction and Overview of Review Process | ML15125A340 |
| 7.0, A | Instrumentation and Controls—Hazard Analysis | ML15132A583 |
| 7.0, B | Instrumentation and Controls—System Architecture | ML15132A603 |
| 7.0, C | Instrumentation and Controls—Simplicity | ML15132A611 |
| 7.0, D | Instrumentation and Controls—References | ML15132A618 |
| 7.1 | I&C—Fundamental Design Principles | ML15125A335 |
| 7.2 | Instrumentation and Controls—System Characteristics | ML15125A360 |
| 8.1 | Electric Power—Introduction | ML15146A269 |
| 8.2 | Offsite Power System | ML15125A425 |
| 8-2 BTP | Use of Diesel-Generator Sets for Peaking | ML15131A386 |
| 8.3.1 | AC Power Systems (Onsite) | ML15125A384 |

| Section | Design-specific review standard title | ADAMS Accession No. |
|---------------|--|---------------------|
| 8.3.2 | DC Power Systems (Onsite) | ML15125A386 |
| 8-3 BTP | Stability of Offsite Power Systems | ML15125A390 |
| 8.4 | Station Blackout | ML15126A149 |
| 8-6 BTP | Adequacy of Station Electric Distribution System Voltages | ML15131A461 |
| 9.1.2 | New and Spent Fuel Storage | ML15125A307 |
| 9.1.3 | Spent Fuel Pool Cooling and Cleanup System | ML15146A034 |
| 9.2.6 | Condensate Storage Facilities | ML15131A245 |
| 9.3.2 | Process and Post-Accident Sampling Systems | ML15131A298 |
| 9.3.4 | Chemical and Volume Control System (PWR) (Including Boron Recovery System) | ML15131A305 |
| 9.3.6 | Containment Evacuation and Flooding Systems | ML15112A190 |
| 9.5.2 | Communications Systems | ML15084A403 |
| 9.5.3 | Lighting Systems | ML15112A148 |
| 10.2 | Turbine Generator | ML15126A086 |
| 10.2.3 | Turbine Rotor Integrity | ML15127A046 |
| 10.3 | Main Steam Supply System | ML15131A329 |
| 10.4.1 | Main Condensers | ML15127A049 |
| 10.4.2 | Main Condenser Evacuation System | ML15127A349 |
| 10.4.3 | Turbine Gland Sealing System | ML15126A477 |
| 10.4.4 | Turbine Bypass System | ML15131A417 |
| 10.4.5 | Circulating Water System | ML15126A467 |
| 10.4.6 | Condensate Cleanup System | ML15118A943 |
| 10.4.7 | Condensate and Feedwater System | ML15126A470 |
| 10.4.10 | Auxiliary Boiler System | ML15131A261 |
| 11.1 | Source Terms | ML15112A526 |
| 11.2 | Liquid Waste Management System | ML15124A607 |
| 11.3 | Gaseous Waste Management System | ML15112A694 |
| 11.4 | Solid Waste Management System | ML15119A057 |
| 11.5 | Process and Effluent Radiological Monitoring Instrumentation and Sampling Systems | ML15118A609 |
| 11.6 | Guidance on I&C Design Features for Process and Effluent Radiological Monitoring and Area Radiation and Airborne Radioactivity Monitoring. | ML15125A367 |
| 12.2 | Radiation Sources | ML15070A194 |
| 12.3-12.4 | Radiation Protection Design Features | ML15070A204 |
| 12.5 | Operational Radiation Protection Program | ML15070A210 |
| 14.2 | Initial Plant Test Program—Design Certification and New License Applicants | ML15084A407 |
| 14.3.2 | Structural and Systems Engineering—Inspections, Tests, Analyses, and Acceptance Criteria | ML15084A411 |
| 14.3.4 | Reactor Systems—Inspections, Tests, Analyses, and Acceptance Criteria | ML15125A294 |
| 14.3.5 | Instrumentation and Controls—Inspections, Tests, Analyses, and Acceptance Criteria | ML15127A383 |
| 14.3.6 | Electrical Systems—Inspections, Tests, Analyses, and Acceptance Criteria | ML15127A373 |
| 14.3.7 | Plant Systems—Inspections, Tests, Analyses, and Acceptance Criteria | ML15131A328 |
| 15.0 | Introduction—Transient and Accident Analyses | ML15125A297 |
| 15.0.3 | Design Basis Accidents Radiological Consequence Analyses for Advanced Light Water Reactors | ML15127A387 |
| 15.1.1-15.1.4 | Decrease in FW Temperature, Increase in FW Flow, Increase in Steam Flow, and Inadvertent Opening of a Steam Generator Relief or Safety Valve. | ML15127A391 |
| 15.1.5 | Steam System Piping Failures Inside and Outside of Containment (PWR) | ML15125A317 |
| 15.1.6 | Loss of Containment Vacuum | ML15127A395 |
| 15.2.1-15.2.5 | Loss of External Load; Turbine Trip; Loss of Condenser Vacuum; Closure of Main Steam Isolation Valve (BWR); and Steam Pressure Regulator Failure (Closed). | ML15127A400 |
| 15.2.6 | Loss of Non-Emergency AC Power to the Station Auxiliaries | ML15125A292 |
| 15.2.7 | Loss of Normal Feedwater Flow | ML15125A293 |
| 15.2.8 | Feedwater System Pipe Breaks Inside and Outside Containment (PWR) | ML15118A927 |
| 15.4.1 | Uncontrolled Control Rod Assembly Withdrawal from a Subcritical or Low Power Startup Condition | ML15118A482 |
| 15.4.2 | Uncontrolled Control Rod Assembly Withdrawal at Power | ML15118A600 |
| 15.4.3 | Control Rod Misoperation (System Malfunction or Operator Error) | ML15131A364 |
| 15.4.6 | Inadvertent Decrease in Boron Concentration in the Reactor Coolant (PWR) | ML15118A474 |
| 15.5.1-15.5.2 | Chemical and Volume Control System Malfunction that Increases Reactor Coolant Inventory | ML15125A463 |
| 15.6.5 | LOCAs Resulting From Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary. | ML15131A334 |
| 15.6.6 | Inadvertent Opening of a PWR Pressurizer Pressure Relief Valve | ML15125A467 |
| 15.9A | Thermal-hydraulic Stability | ML15131A311 |
| 16.0 | Technical Specifications | ML15131A316 |

Dated at Rockville, Maryland, this 23rd day of June 2015.

For the Nuclear Regulatory Commission.

Jenny M. Gallo,

Project Manager, Small Modular Reactor Licensing Branch, Division of Advanced Reactors and Rulemaking, Office of New Reactors.

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NUCLEAR REGULATORY COMMISSION

[NRC-2015-0001]

Sunshine Act Meeting Notice

DATE: June 29, July 6, 13, 20, 27, August 3, 2015.