



[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[NRC-2013-0089]

mPower™ Design-Specific Review Standard

AGENCY: Nuclear Regulatory Commission.

ACTION: Design-Specific Review Standard (DSRS) for the mPower™ Design; request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is soliciting public comment on the Design-Specific Review Standard (DSRS) for the mPower™ design (mPower™ DSRS). The purpose of the mPower™ DSRS is to more fully integrate the use of risk insights into the review of a design certification (DC), an early site permit (ESP) or a combined license (COL) that incorporates the mPower™ design.

DATES: Submit comments by **August 16, 2013**. Comments received after this date will be considered, if it is practical to do so, but the Commission is able to ensure consideration only for comments received on or before this date.

ADDRESSES: You may submit comment 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-2013-0089**. Address questions about NRC dockets to Carol Gallagher;

telephone: 301-492-3668; e-mail: Carol.Gallagher@nrc.gov. For technical questions, contact the individual(s) 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: TWB-05-B01M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.
- **Fax comments to:** RADB at 301-492-3446.

For additional direction on accessing information and submitting comments, see “Accessing Information and Submitting Comments” in the SUPPLEMENTARY INFORMATION section of this document.

FOR FURTHER INFORMATION CONTACT: Ms. Yanelly Malave, Office of New Reactors, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001; telephone: 301–415–1519 or e-mail at Yanelly.Malave@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Accessing Information and Submitting Comments

A. Accessing Information

Please refer to Docket ID **NRC-2013-0089** when contacting the NRC about the availability of information regarding this document. You may access information related to this document, which the NRC possesses and is publicly-available, by the following methods:

- **Federal Rulemaking Web site:** Go to <http://www.regulations.gov> and search for Docket ID **NRC-2013-0089**.

- **NRC’s Agencywide Documents Access and Management System (ADAMS):** You may access publicly-available documents online in the NRC Library 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 e-mail to pdr.resource@nrc.gov. The ADAMS accession number for each document referenced in this notice (if that document is available in ADAMS) is provided the first time that a document is referenced and also in the table included in this notice. The mPower™ DSRS Scope and Safety Review Matrix is available in ADAMS under Accession No.

ML13088A252.

- **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-2013-0089** in the subject line of your comment submission, in order to ensure that the NRC is able to make your comment submission available to the public in this docket.

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 posts all comment submissions at <http://www.regulations.gov> as well as entering 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 submissions into ADAMS.

II. Further Information

A. Background

In 2010, the Commission provided direction to the staff on the preparation for, and review of, small modular reactor (SMR) applications, with a near-term focus on integral pressurized water reactor (iPWR) designs. The Commission directed the 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 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 Design-Specific Review Standard. This DSRS for the mPower™ design is the result of the implementation of the Commission's direction.

B. Design-Specific Review Standard (DSRS) for the mPower™ Design

As part of the mPower™ Design-Specific Review Plan, the Office of New Reactors has issued the mPower™ Design-Specific Review Standard Scope and Safety Review Matrix to reflect the integration of risk insights into the review of applications submitted for the mPower™ DC, and ESPs or COLs that incorporate the mPower™ design under 10 CFR Part 52. The mPower™ DSRS reflects current staff review methods and practices based on the integration of

risk insights and, where appropriate, lessons learned from NRC reviews of DC and COL applications completed since the last revision of the Standard Review Plan.

The NRC staff is issuing this notice to solicit public comment on the mPower™ DSRS Scope and Safety Review Matrix (Matrix), and the individual mPower™-specific DSRS sections. Specifically, we request comment on the sufficiency of the proposed mPower™ review scope encompassed by the Matrix, and comment on technical content of the individual mPower™ DSRS sections identified in the table below that were revised or developed to incorporate design-specific review guidance based on features of the mPower™ reactor design. We are not, however, soliciting detailed technical comments on NUREG-0800 Standard Review Plan sections that are designated with the applicability “A) Use SRP Section as-is...” in the Matrix unless their adequacy for review of the mPower™ design is in question.

Section	Design-Specific Review Standard Title	ADAMS No.
Matrix	mPower™ DSRS Scope and Safety Review Matrix	ML13088A252
2.4.0	Hydrology Review	ML12355A691
2.4.1	Hydrologic Description	ML12221A023
2.4.2	Floods	ML12221A024
2.4.3	Probable Maximum Flood (PMF) on Streams and Rivers	ML12221A025
2.4.4	Potential Dam Failures	ML12221A026
2.4.5	Probable Maximum Surge and Seiche Flooding	ML12221A027
2.4.6	Probable Maximum Tsunami Flooding	ML12221A028
2.4.7	Ice Effects	ML12221A017
2.4.9	Channel Diversions	ML12221A018
2.4.10	Flooding Protection Requirements	ML12221A019
2.4.12	Groundwater	ML12221A020
2.4.13	Accidental Releases of Radioactive Liquid Effluents in Ground and Surface Waters	ML12221A021
2.4.14	Technical Specifications and Emergency Operation Requirements	ML12221A022
3.2.1	Seismic Classification	ML12272A013
3.2.2	System Quality Group Classification	ML12272A015
3.3.1	Severe Wind Loading	ML12324A156
3.3.2	Extreme Wind Loads (Tornado and Hurricane Loads)	ML12324A166
3.4.1	Internal Flood Protection for Onsite Equipment Failure	ML12312A148
3.4.2	Protection of Structures Against Flood From External Sources	ML12324A190
3.5.1.1	Internally Generated Missiles (Outside Containment)	ML12313A158

3.5.1.2	Internally Generated Missiles (Inside Containment)	ML12313A396
3.5.1.3	Turbine Missiles	ML12272A209
3.5.1.4	Missiles Generated by Extreme Winds	ML12313A399
3.5.1.5	Site Proximity Missiles (Except Aircraft)	ML12318A151
3.5.1.6	Aircraft Hazards	ML12318A198
3.5.2	Structures, Systems, and Components To Be Protected From Externally Generated Missiles	ML12313A457
3.5.3	Barrier Design Procedures	ML12222A003
3.6.2	Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping	ML12230A013
3.7.1	Seismic Design Parameters	ML13099A204
3.7.2	Seismic System Analysis	ML13099A205
3.7.3	Seismic Subsystem Analysis	ML13099A209
3.8.2	Steel Containment	ML13099A298
3.8.3	Concrete and Steel Internal Structures of Steel Containments	ML13099A312
3.8.4	Other Seismic Category I Structures	ML13099A316
3.8.5	Foundations	ML13099A319
3.9.1	Special Topics for Mechanical Components	ML12272A018
3.9.4	Control Rod Drive Systems	ML12272A020
3.9.5	Reactor Pressure Vessel Internals	ML12272A077
3.9.6	Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints	ML12272A217
3.11	Environmental Qualification of Mechanical and Electrical Equipment	ML12277A018
3.13	Threaded Fasteners - ASME Code Class 1, 2, and 3	ML12272A214
BTP 3-4	Postulated Rupture Locations in Fluid System Piping Inside and Outside Containment	ML12272A102
4.2	Fuel System Design	ML12235A168
4.3	Nuclear Design	ML12353A188
4.4	Thermal and Hydraulic Design	ML12319A580
4.5.1	Control Rod Drive Structural Materials	ML12326A740
4.5.2	Reactor Internal and Core Support Structure Materials	ML12272A006
4.6	Functional Design of Control Rod Drive System	ML12353A182
5.2.1.1	Compliance With the Codes and Standards Rule, 10 CFR 50.55a	ML12272A091
5.2.1.2	Applicable Code Cases	ML12272A096
5.2.3	Reactor Coolant Pressure Boundary Materials	ML12272A007
5.2.5	Reactor Coolant Pressure Boundary Leakage Detection	ML12313A468
5.3.1	Reactor Vessel Materials	ML12272A008
5.3.2	Pressure-Temperature Limits, Upper-shelf Energy, and Pressurized Thermal Shock	ML12272A009
5.3.3	Reactor Vessel Integrity	ML12272A010
5.4.2.1	Steam Generator Materials	ML12272A244
5.4.2.2	Steam Generator Program	ML12272A245
5.4.7	Residual Heat Removal (RHR) System	ML12319A582

BTP 5-4	Design Requirements of the Residual Heat Removal System	ML12275A020
6.1.1	Engineered Safety Features Materials	ML12276A107
6.1.2	Protective Coating Systems (Paints) - Organic Materials	ML12272A246
6.2.1	Containment Functional Design	ML12276A117
6.2.1.1	mPower iPWR Containment	ML12227A377
6.2.1.2	Subcompartment Analysis	ML12230A014
6.2.1.3	Mass and Energy Release Analysis for Postulated Loss of Coolant Accidents	ML12230A034
6.2.1.4	Mass and Energy Release Analysis for Postulated Secondary System Pipe Ruptures	ML12230A037
6.2.2	Containment Heat Removal Systems	ML12276A118
6.2.4	Containment Isolation System	ML12276A120
6.2.5	Combustible Gas Control in Containment	ML12276A124
6.2.6	Containment Leakage Testing	ML12276A127
6.2.7	Fracture Prevention of Containment Pressure Boundary	ML12278A103
6.4	Control Room Habitability System	ML12272A225
6.6	Inservice Inspection and Testing of Class 2 and 3 Components	ML12284A064
BTP 6-1	PH for Emergency Coolant Water for Pressurized Water Reactors	ML12222A198
BTP 6-2	Minimum Containment Pressure Model for PWR ECCS Performance Evaluation	ML12227A380
BTP 6-4	Containment Purging During Normal Plant Operations	ML12227A384
7.0 (DSRS)	Instrumentation and Controls -Introduction and Overview of Review Process	ML12314A197
7.1 (DSRS)	Instrumentation and Controls - Fundamental Design Principles	ML12313A479
7.2 (DSRS)	Instrumentation and Controls - System Characteristics	ML12314A201
7.0 APP A (DSRS)	Instrumentation and Controls - Hazard Analysis	ML12318A200
7.0 APP B (DSRS)	Instrumentation and Controls - System Architecture	ML12318A201
7.0 APP C (DSRS)	Instrumentation and Controls - Simplicity	ML12318A204
7.0 APP D (DSRS)	Instrumentation and Controls - References	ML12318A205
8.1	Electric Power / Introduction	ML12269A005
8.2	Offsite Power System	ML12269A006
8.3.1	A C Power Systems (Onsite)	ML12269A010
8.3.2	D C Power Systems (Onsite)	ML12269A011
8.4	Station Blackout	ML12269A015
BTP 8-2	Use of Diesel-Generator Sets for Peaking	ML12269A016
BTP 8-3	Stability of Offsite Power Systems	ML12269A017
BTP 8-6	Adequacy of Station Electric Distribution System Voltages	ML12269A018
9.1.3	Spent Fuel Pool Cooling and Cleanup System	ML12319A063
9.2.1	Station Service Water System	ML12319A068

9.2.2	Reactor Auxiliary Cooling Water Systems	ML12325A088
9.2.4	Potable and Sanitary Water Systems	ML12319A091
9.2.5	Ultimate Heat Sink	ML12319A423
9.2.6	Condensate Storage Facilities	ML12270A276
9.3.2	Process and Post Accident Sampling Systems	ML12170A005
9.3.3	Equipment and Floor Drainage System	ML12319A437
9.4.1	Control Room Area Ventilation System	ML12276A130
9.4.2	Spent Fuel Pool Area Ventilation System	ML12272A229
9.4.3	Reactor Service Building HVAC Systems	ML12276A133
9.4.4	Turbine Area Ventilation System	ML12221A117
9.5.2	Communications Systems	ML12277A361
9.5.3	Lighting Systems	ML12319A516
10.2	Turbine Generator	ML12320A111
10.2.3	Turbine Rotor Integrity	ML12272A247
10.3	Main Steam Supply System	ML12320A134
10.3.6	Steam and Feedwater System Materials	ML12272A004
10.4.1	Main Condensers	ML12320A139
10.4.2	Main Condenser Evacuation System	ML12320A146
10.4.3	Turbine Gland Sealing System	ML12320A157
10.4.4	Turbine Bypass System	ML12320A161
10.4.5	Circulating Water System	ML12320A172
10.4.6	Condensate Cleanup System	ML12272A242
10.4.7	Condensate and Feedwater System	ML12320A183
11.1	Source Terms	ML12222A292
11.2	Liquid Waste Management Systems	ML12257A228
11.3	Gaseous Waste Management Systems	ML12257A227
11.4	Solid Waste Management Systems	ML12257A223
11.5	Process and Effluent Radiological Monitoring Instrumentation and Sampling Systems	ML12258A115
11.6	Guidance on Instrumentation and Control Design Features for Process and Effluent Radiological Monitoring, and Area Radiation and Airborne Radioactivity Monitoring	ML13023A089
BTP 11-3	Design Guidance for Solid Radioactive Waste Management Systems Installed in Light-Water -Cooled Nuclear Power Reactor Plants	ML12222A293
BTP 11-5	Postulated Radioactive Releases Due to a Waste Gas System Leak or Failure	ML12222A294
12.1	Assuring that Occupational Radiation Exposures Are As Low As Is Reasonably Achievable	ML12222A295
12.2	Radiation Sources	ML12222A296
12.3 - 12.4	Radiation Protection Design Features	ML12269A175
12.5	Operational Radiation Protection Program	ML12257A224
14.2	Initial Plant Test Program - Design Certification and New License Applicants	ML12121A037
14.3.2	Structural and Systems Engineering - Inspections, Tests, Analyses,	ML12272A243

	and Acceptance Criteria	
14.3.4	Reactor Systems - Inspections, Tests, Analyses, and Acceptance Criteria	ML12353A174
14.3.5	Instrumentation and Controls - Inspections, Tests, Analyses, and Acceptance Criteria	ML12325A091
14.3.6	Electrical Systems - Inspections, Tests, Analyses, and Acceptance Criteria	ML12320A188
14.3.7	Plant Systems - Inspections, Tests, Analyses, and Acceptance Criteria	ML12320A195
14.3.8	Radiation Protection - Inspections, Tests, Analyses, and Acceptance Criteria	ML12257A225
15.0	Introduction—Transient and Accident Analyses	ML12275A026
15.0.2	Review of Transient and Accident Analysis Methods	ML12207A098
15.0.3	Design Basis Accident Radiological Consequence Analyses for Advanced Light Water Reactors	ML12257A226
15.1.5	Steam System Piping Failures Inside and Outside of Containment	ML12207A108
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)	ML12319A584
15.2.6	Loss of Nonemergency AC Power to the Station Auxiliaries	ML12319A587
15.2.7	Loss of Normal Feedwater Flow	ML12250A248
15.2.8	Feedwater System Pipe Breaks Inside and Outside Containment (PWR)	ML12319A668
15.3.1 - 15.3.2	Loss of Forced Reactor Coolant Flow Including Trip of Pump Motor and Flow Controller Malfunctions	ML12319A585
15.3.3 - 15.3.4	Reactor Coolant Pump Rotor Seizure and Reactor Coolant Pump Shaft Break	ML12319A586
15.4.1	Uncontrolled Control Rod Assembly Withdrawal from a Subcritical or Low Power Startup Condition	ML12240A005
15.4.2	Uncontrolled Control Rod Assembly Withdrawal at Power	ML12242A102
15.4.10	Startup of an Inactive Pump or Pumps at an Incorrect Temperature, and Flow Controller Malfunction causing an Increase in Core Flow Rate	ML12261A399
15.5.1 - 15.5.2	Inadvertent Operation of ECCS and Reactor Coolant Inventory and Purification System (RCI) Malfunction that Increases Reactor Coolant Inventory	ML12319A575
15.6.1	Inadvertent Opening of a Pressurizer Safety Valve, or an Automatic Depressurization Valve	ML12250A318
15.6.5	Loss of Coolant Accidents Resulting From Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary	ML12319A576
15.8	Anticipated Transients Without Scram	ML12319A577
15.9.A	Thermal Hydraulic Stability	ML12261A042
16.0	Technical Specifications	ML12270A277

Dated at Rockville, Maryland, this 6th day of May, 2013.

For the Nuclear Regulatory Commission.

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