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Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Plants

Comment On: NRC-2021-0179-0001
Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors

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Submitter Information

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General Comment

See attached file(s)

Attachments

06-21-22 -- NUGEQ Comments on DG-1389 (RG 1.183 Rev. 1)

NUCLEAR UTILITY GROUP
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June 21, 2022

Mr. Meraj Rahimi, Chief
Regulatory Guide and Programs Management Branch
Division of Engineering
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subj: Comments by the ***Nuclear Utility Group on Equipment Qualification*** Regarding Draft Regulatory Guide, DG-1389, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors" -- Docket ID: NRC-2021-0179

Dear Mr. Rahimi:

The Nuclear Utility Group on Equipment Qualification ("NUGEQ" or "Group")[1] hereby submits one general observation and two comments on the proposed Revision 1 to Regulatory Guide (RG) 1.183 issued with a temporary identification of Draft Regulatory Guide, DG-1389, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." These comments are being submitted in accordance with *Federal Register* notice "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," dated April 22, 2022. *See* 87 Fed. Reg. 23, 891. The comments by the Group are generally related to ensuring that DG-1393 reflects or acknowledges the resolution of GSI-187[2] which occurred after the issuance of RG 1.183 Revision 0.

DG-1389 seeks to describe methods that are acceptable to the NRC staff for in complying with regulations for design basis accident (DBA) dose consequence analysis using an Alternative Source Term (AST). Revision 0 of RG 1.183 provides a method acceptable to the NRC staff for complying with the regulatory requirements in 10 CFR § 50.67. DG-1389 proposes to extend

[1] The Group represents approximately 75% of the operating nuclear power plants in the United States. The Group was founded in 1981, as the NRC staff was evaluating and planning the ultimate promulgation of 10 CFR 50.49, "Environmental qualification of electric equipment important to safety for nuclear power plants." Since its inception, the Group has been actively involved in the development and implementation of licensee EQ programs, and in interaction with the NRC, regarding evolving NRC requirements and guidance. The Group most recently also was actively involved in the recent NRC DBA EQ program inspections and worked with licensees and the NRC in addressing implementation issues associated with those inspections.

[2] Resolution of Generic Safety Issues – Issue 187: "The Potential Impact of Postulated Cesium Concentration on Equipment Qualification (NUREG-0933, Main Report with Supplements 1-35) [ML21251A113]

the applicability of this guide for use by advanced and passive light-water reactors. Among other things, it would endorse a source term derived from SAND-2011-0128, "Accident Source Terms for Light Water Nuclear Power Plants Using High-Burnup of MOX Fuel," issued January 2011, and provides guidance on the acceptable attributes of other ASTs. The Group notes that the impetus (at least, in part) for revising RG 1.183 is also generically applicable to radiological source terms based on TID-14844. As such, a corresponding revision to RG 1.195, "Methods and Assumptions for Evaluating Radiological Consequences of Design Basis Accidents at Light-Water Nuclear Power Reactors" appears warranted.

Respectfully submitted,

William A. Horin

William A. Horin, Winston & Strawn
Counsel to the Nuclear Utility Group on Equipment Qualification

Attachment

NUGEQ Comments on DG-1389 - Proposed Revision 1 to Regulatory Guide 1.183

Reviewed Document: U.S. NRC Draft Regulatory Guide DG-1389, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," Issued April 2022.

No.	Comment Type[note 1]	Section / Page	Current Wording	Comment or Feedback	Basis for Comment / Proposed Changes (as applicable)
1	O	Section B / Reason for Revision / pg 5	This revision of the guide (Revision 1) addresses new issues identified since the guide was originally issued. "These include (1) ……(6) **adding guidance for accident tolerant fuel (ATF), high-burnup fuel, and increased enrichment source term analyses**, (7)……"	General Observation: Some of the drivers for revising RG 1.183 are also generically applicable to radiological source terms based on TID-14844. Specifically, Section B. Discussion - Reason for Revision (6), to add guidance for Accident Tolerant fuel (ATF), Mixed Oxide (MOX) fuel, higher burnup or higher enrichment source term analysis could also be relevant to source terms based on TID-14844 in a similar manner to Alternative Source Terms (AST). As a result, a corresponding revision to RG 1.195 appears warranted.	NUGEQ is not aware of any ongoing actions by the staff to update/revise RG 1.195, "Methods and Assumptions for Evaluating Radiological Consequences of Design-Basis Accidents at Light-Water Nuclear Power Reactors." This regulatory guide was last reviewed by the NRC in 2016. Any update to RG 1.195 should provide guidance on using TID-14844 timing and distribution assumptions with high burnup or high enrichment fuel to address the regulatory position in C.3.1 of RG 1.195, "Core inventory factors (curies per megawatt thermal) provided in TID-14844 and used in some analysis computer codes were derived for low-burnup, low-enrichment fuel and should not be used with higher burnup and higher enrichment fuels."
2	C	Section B / Background / pg 6	Revision 0 of RG 1.183 provides guidance for environmental qualification (EQ) that references the guidance in RG 1.89, Revision 1, "Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants" (Ref. 12). RG 1.89 is currently undergoing revision to incorporate guidance on an AST. Reactors licensed under 10 CFR Part 50 or applicants for licenses under	The proposed wording in the background section should be clarified to clearly reflect that the guidance in Appendix I to Revision 0 of RG 1.183 is specific to operating reactors that have amended their licensing basis to use AST for EQ.	The intent of the comment is to reflect closure of the staff's interim position in Section C.6, "Assumptions for Evaluating the Radiation Doses for Equipment Qualification" from RG 1.183 R0. Also See Comment #3.

No.	Comment Type[note 1]	Section / Page	Current Wording	Comment or Feedback	Basis for Comment / Proposed Changes (as applicable)
			10 CFR Part 50 or 10 CFR Part 52 should use the guidance in Appendix I to Revision 0 of RG 1.183, until RG 1.89 incorporates guidance on an AST.		
3	C	C.1.3.5 / pg 14	Equipment Environmental Qualification: A proposed plant modification associated with the AST implementation may affect current EQ analyses. The licensee should update EQ analyses that have assumptions or inputs affected by the plant modification to address these impacts.	This comment is intended to cover those Part 50 licensees who have adopted full or selective implementation of § 50.67 as described in Sections 1.1.3 and 1.2 of DG-1389, but retained TID-14844 as the source term for environmental qualification of equipment. DG-1389 should clarify or otherwise specifically address the ability of a licensee to continue to use source terms based on TID-14844 for Environmental Qualification consistent with the licensing basis of the plant. Specifically, the wording in Section C.1.3.5 of DG-1389 should be reworded to reflect, that consistent with a plants' licensing basis and the resolution of GSI-187, "The Potential Impact of Postulated Cesium Concentration on Equipment Qualification in the Containment Sump" licensees may continue to utilize the TID-14844 radiological source term to establish environmental qualification of equipment subject to 10 CFR 50.49.	To clarify that the applicability of AST to EQ is specific to licensees who have amended their licensing basis to apply AST for environmental qualification of equipment under § 50.49. This clarification would result in consistency with the resolution of GSI-187 as well as the Statement of Considerations for 10 CFR 50.67, which states "The NRC considered the applicability of the revised source terms to operating reactors and determined that the current analytical approach based on the TID–14844 source term would continue to be adequate to protect public health and safety, and that operating reactors licensed under this approach would not be required to reanalyze accidents using the revised source terms." *See* 64 FR 71992. See References 1 and 2 below for the basis for closure of GSI-187. The resolution of GSI-187 occurred after the issuance of RG 1.183, R0. As noted in Reference 2 [ML011210348], "The panel has decided that the candidate generic issue should be dropped, as having no significant chance of meeting the incremental risk thresholds for backfit as described in the MD 6.4 Handbook."

NUGEQ Comments on DG-1389 - Proposed Revision 1 to Regulatory Guide 1.183

Note 1: Codes for Types of Comments - (E) = Editorial (C) = Comment, (Q) = Question, (O) = Observation

REFERENCES:

1) NUREG-0933, Main Report with Supplements 1-35, Section 3. New Generic Issues – Issue 187: The Potential Impact of Postulated Cesium Concentration on Equipment Qualification. [ML21251A113]
2) Memorandum for A. Thadani from J. Rosenthal, "Initial Screening of Candidate Generic Issue 187, 'The Potential Impact of Postulated Cesium Concentration on Equipment Qualification in the Containment Sump,'" April 30, 2001. [ML011210348]