

From: [Brian Magnuson](#)
To: [Smith, Micheal](#)
Cc: [Blumberg, Mark](#); [Meighan, Sean](#)
Subject: [External_Sender] RE: Regulatory Guide 1.183 Revision Public Meeting Notice
Date: Thursday, November 19, 2020 12:55:52 PM

Micheal:

I'm not sure how much time will be available today for comments; therefore, I have included some observations and questions regarding the presentation below.

Please review accordingly and let me know if you have any questions.

Thank you,
Brian

The NRC staff has restarted efforts to revise RG 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors."

DG-1199 (Draft RG 1.183 Revision 1) was approved (but not issued) by the NRC in 2010. After ten years, what prompted this effort?

incorporate relevant operating experience as well as recent post-Fukushima seismic risk insights and walkdowns;

Insights from Fukushima were previously incorporated into RASCAL (NUREG-1430) source terms and methodologies. Will these same insights be incorporated into RG 1.183 Revision 1? Why is the revision to RG 1.183 lagging behind revisions to RASCAL? Also, please explain why RASCAL does not use RG 1.183 source terms and methodologies.

ensure sufficient guidance is in place for licensing advanced light-water reactors (LWRs), accident tolerant fuel (ATF), high-burnup, and increased enrichment fuel; and,

NUREG-1465 (1995) "Accident Source Terms for Light-Water Nuclear Power Plants":

"Recent information has indicated that high burnup fuel, that is, fuel irradiated at levels in excess of about 40 GWD/MTU, may be more prone to failure during design basis reactivity insertion accidents (RIA) than previously thought. Preliminary indications are that high burnup fuel also may be in a highly fragmented or powdered form, so that failure of the cladding could result in a significant fraction of the fuel itself being released."

The underlying concern identified here is a cladding failure source term release could exceed that of a fuel melt source term release. What should be considered is, the radiological consequences of a lessor and more likely

accident may be the new “maximum credible accident.”

Reports and studies (e.g., Resolution of Generic Safety Issues: Issue 170: Fuel Damage Criteria for High Burnup Fuel (Rev. 2)) have evaluated high-burnup fuel and approved higher burn-up levels, but they have neither disputed the fuel disintegration caused by high-burnup nor evaluated the consequences of a powdered fuel source term. Until this NUREG-1465 concern has been openly eliminated, any revision to RG 1.183 should include a powdered fuel source term.

Limited range of applicability on Non-LOCA release fractions

Notably, DG-1199 significantly increased Non-LOCA noble gas release fractions (above RG 1.183 Revision 0) and returned them to NUREG-1465 levels.

Excessive MSIV leakage rates and the TMI accident prompted control room habitability studies, regulation and modifications to install Control Room Emergency Ventilation/Filter Systems. Subsequently, RG 1.183 Revision 0 required Control Room Operator) doses to be evaluated for specific accidents, including the Non-LOCA fuel handling accident (FHA); however, missing from RG 1.183 is a requirement to evaluate doses to those fuel handlers/workers that would be in close proximity to this accident. Given the concerns identified the NRC identified in Information Notice No. 90-08: “*KR-85 Hazards From Decayed Fuel*” and the doses to control room the doses these ground zero workers could exceed federal limits and threaten their health and safety.

Because the water in spent fuel pools will not prevent the release of noble gas (Kr-85, a pure beta emitter) in a FHA (mechanical damage or overheating), revisions to RG 1.183 should require the analysis of local doses to ensure the safety of workers in the area at the time of the accident. Additionally, the Non-LOCA FHA source term and methodologies should be used to ensure the viability of FLEX actions to intended to mitigate an extended loss of spent fuel pool cooling.

DG-1199

In October 2009, the NRC issued for public comment DG-1199 as a proposed Rev. 1 of RG 1.183.

Staff received 150 public comments

The reasons for revision of RG 1.183 in DG-1199 were:

Providing additional guidance for modeling BWR MSIV leakage,

SAND2008-6601 determined RG 1.183 BWR MSIV leakage source terms and methodologies are “non-conservative and conceptually in error.” These conceptual errors (and others) should be corrected in any revision to RG 1.183.

2019 License Amendment Requests

In 2019, NRC received several AST LARs requesting increased MSIV leakage. As a result, work on DG-1199 was postponed to allow NRC staff to incorporate lessons learned, from evaluation of the LARs, into the revised RG 1.183:

James A. FitzPatrick Amendment No. 338 for AST, July 21, 2020 (ML20140A070)
Quad Cities Nuclear Power Station, Units 1 & 2 – Amendment Nos. 281 and 277 to increase allowable MSIV leakage, June 26, 2020 (ML20150A328)
Nine Mile Point Nuclear Station, Unit 2 – Amendment No. 182 to change allowable MSIV leak rates, October 20, 2020 (ML20241A190)
Dresden Nuclear Power Station, Units 2 & 3 – Amendments Nos. 272 and 265 to increase allowable MSIV leakage, October 23, 2020 (ML20265A240)

Does the NRC mean say LARs from last year (2019) cause a 10-year delay? DG-1199 was approved (but not issued) by the NRC in 2010. In consideration of “The NRC Approach to Open Government,” please explain the 10-year delay.

Because SAND2008-6601 clearly explains/illustrates that RG 1.183 MSIV Leakage source terms and metrologies are “non-conservative and conceptually in error,” it does not seem that LARs to increase MSIV leakage are in the best interest of public health and safety.

The intent of the NRC staff is for RG 1.183 Rev. 0 and Rev. 1 to co- exist

According to RG 1.183, “*The design basis accident source term is a fundamental assumption upon which a significant portion of the facility design is based.*” Given this and SAND2008-6601, how does the existence (coexistence) and continued use of the non-conservative and conceptual errors in RG 1.183 benefit the health and safety of the public?

Revised Fuel Handling Accident

Revisited the original studies forming the technical basis for the FHA and incorporate updated information.

Model improvements established from the current understanding of reactor fuel pin physics and iodine chemistry under the environmental conditions in which fuel handling operations are taking place.

Concluded that considerable margin exists regarding the scrubbing effects of iodine in the spent fuel or reactor pool and that the current staff DBA FHA fission product transport model can be refined while still maintaining conservatism.

Reference: Memo from RES to NRR, “Closeout to Research Assistance Request for Independent Review of Regulatory and Technical Basis for Revising the Design-basis Accident Fuel Handling Accident,” November 23, 2019 (ML19270E335)

While there may be margin regarding the scrubbing effects of iodine, there is no margin regarding the release of Kr-85 in a DBA FHA. Please consider DBA FHA doses to control room operators and extrapolate local area doses. No amount of water in spent fuel pools or the reactor pools, will shield or prevent the release of a noble gas (Kr-85) in a DBA FHA (or other accidents that cause mechanical or overheating damage in these pools).

Consideration of “*KR-85 Hazards From Decayed Fuel*” (Information Notice No. 90-08) is conspicuously missing from RG 1.183 Revision 0. It should be included in any revision.

Over the last 10 years no applicant or licensee has adopted the methodology from SAND2008-6601, “Analysis of Main Steam Isolation Valve Leakage in Design Basis Accident Using MELCOR 1.8.6 and RADTRAD.”

There have been no communications that applicants or licensees intend to adopt the SAND2008-6601 methodology.

SAND2008-6601 clearly explains/illustrates that RG 1.183 BWR MSIV source terms and methodologies are “non-conservative and conceptually in error.” It identifies a safety concern (with a complex array of regulatory implications); however, this concern was not enough to motivate nuclear power plant owners/operators to adopt SAND2008-6601 or otherwise correct the non-conservative errors in RG 1.183—that adversely affect the health and safety of the public. This is the crux of the matter and the reason for PRM-50-122.

From: [Brian Magnuson](#)

Sent: Wednesday, November 4, 2020 10:31 PM

To: [Smith, Micheal](#)

Cc: [Blumberg, Mark](#); [Meighan, Sean](#)

Subject: Re: Regulatory Guide 1.183 Revision Public Meeting Notice

Micheal/Mark:

I appreciate the notification and plan to attend.

Thank you,

Brian

On Nov 4, 2020, at 10:33, Smith, Micheal <Micheal.Smith@nrc.gov> wrote:

Hello,

My name is Micheal Smith and I am currently the project lead for the revision of Regulatory Guide 1.183. Mark Blumberg (project technical lead) informed me that you might be interested in the revision of RG 1.183 so I am reaching out to inform you that we have a public meeting scheduled for November 19th from 1pm -4pm EST. The link to the public meeting notice is below.

<https://www.nrc.gov/pmns/mtg?do=details&Code=20201297>

Enjoy the rest of your week!

<image001.jpg>

Micheal Smith

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