

April 29, 2013

MEMORANDUM TO: Anna H. Bradford, Branch Chief
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Division of Advanced Reactors and Rulemaking
Office of New Reactors

FROM: Wesley W. Held, Project Manager */RA/*
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SUBJECT: SUMMARY OF APRIL 17, 2013, PUBLIC MEETING TO
DISCUSS INDUSTRY POSITION PAPER ON SMALL MODULAR
REACTOR SOURCE TERMS

On April 17, 2013, the U.S. Nuclear Regulatory Commission (NRC) staff held a public meeting with the Nuclear Energy Institute (NEI) to discuss their December 27, 2012, submittal of a position paper on small modular reactor (SMR) source terms (Agencywide Documents Access Management System (ADAMS) ML13004A390). The purpose of the meeting was to facilitate discussion between the NRC and NEI regarding the content of the paper.

Summary

Mr. Wesley Held, Small Modular Reactor Licensing Branch 2 (SMRLB2), Division of Advanced Reactors and Rulemaking (DARR), Office of New Reactors (NRO), opened the meeting. Mr. Held provided some background information regarding recent NRC staff and NEI interactions on the paper and its development. Mr. Held then turned the meeting over to Mr. TJ Kim, NEI, for his opening remarks. Mr. Kim thanked the staff for hosting the meeting and introduced the contributors to the paper, Mr. Steven Mirsky, Mr. Edward Burns, and Mr. Steve Kline.

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Following Mr. Kim's remarks, industry representatives and NEI presented their SMR source term concepts under two main categories: 1) accident analysis using current source term methodology as outlined in NRC Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents"; and 2) accident analysis using source terms specific to SMR design characteristics. Under category 2 there were three options presented by industry and NEI. These include:

- Use of the category 1 RG 1.183 methodology, taking additional credit for longer release times or other release pathway credits for deposition and holdup, including the non-safety related reactor building.
- Use of a mechanistic source term (MST), a design-specific best estimate consequence analysis.
- A hybrid MST approach that would use the core melt source term from RG-1.183, but could combine a slower melting action with slower release pathway, taking credit for physical properties of the containment and reactor building hold-up and decay.

It was noted by industry representatives and NEI that the reason for considering an alternate methodology to RG 1.183 for integral pressurized water reactors (iPWRs) is that the iPWR designs have eliminated large primary coolant piping and therefore a large break loss of coolant accident does not appear to be possible. In addition, iPWRs have a small core thermal power and a greater reliance on passive safety systems.

The industry representatives and NEI also indicated their plans for potential future source term study, including:

- Small containment aerosol deposition
- Small piping fission product deposition
- Small containment penetration leak rate testing
- Reactor building fission product dilution and deposition
- Submerged containment leakage aerosol removal

The NRC staff agreed that the position paper provided a good general overview of options for the iPWR-specific source term, but noted that the paper or subsequent papers or topical reports should provide details or research plans that would validate credit for non-safety related reactor building deposition. In addition, the NRC staff stated that additional information would be necessary on how the iPWRs would fit into the current licensing framework, including accident event categorization, use of probabilistic risk assessment, applicability of calculation models, treatment of uncertainty for the MST, and selection of safety related structures systems and components.

The NRC staff emphasized that the overall approach of using a MST has previously been addressed by the agency, as described in a July 1993 Staff Requirements Memorandum that allowed the use of the process, but the application of a MST for specific licensing purposes such as a scaled emergency planning zone may require Commission consideration or an exemption from the regulations for iPWRs. The NRC staff also stated that use of a risk-informed MST for plant siting may require a review of the applicant's detailed probabilistic risk assessment (PRA). Validation of the PRA and MST modeling may be resource intensive for a first-of-a-kind design.

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The meeting concluded with comments and questions from public stakeholders.

The slides from the NEI presentations are available through the Agencywide Documents Access and Management System (ADAMS) under ML13107A193. ADAMS is the system that provides text and image files of NRC's public documents. Documents are available electronically at the NRC's Electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html>. If you do not have access to ADAMS or have problems accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) staff at 1-800-397-4209, 301-415-4737, or pdrc@nrc.gov.

A participant list is included in the Enclosure.

Enclosure:
Participant List

cc w/encl: NEI New Reactors Mailing List

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Participant List

Public Meeting to Discuss Industry Position Paper on Small Modular Reactor Source Terms

Wednesday, April 17, 2013

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Enclosure

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(Revised 04/22/2013)

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