

July 15, 2014

MEMORANDUM TO: Tara Inverso, Chief
Rulemaking Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

FROM: Aaron L. Szabo, Cost Analyst */RA/*
Rulemaking Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF JUNE 18 TO JUNE 19, 2014 PUBLIC MEETING
ON THE FILTERING STRATEGIES RULEMAKING AND ORDER
EA-13-109

The U.S. Nuclear Regulatory Commission (NRC) held a Category 2 public meeting on June 18-19, 2014, to discuss the filtering strategies rulemaking and Order EA-13-109. The public meeting was held at the NRC headquarters location in Rockville, Maryland. The purpose of the meeting was to discuss: (1) detailed cost estimates based on information submitted by the Nuclear Energy Institute (NEI) on May 31, 2014; (2) Modular Accident Analysis Program (MAAP) and probabilistic risk assessment (PRA) core damage event trees (CDET) and accident progression event trees (APET) provided by industry; (3) MELCOR and PRA CDET and APET provided by the NRC staff; (4) initial thoughts on the use of qualitative factors by the NRC staff; and (5) Boiling Water Reactor (BWR) Mark I and Mark II Phase 2 Order strategy (EA-13-109) provided by industry.

The meeting was attended by 60 individuals primarily representing industry representatives and NRC staff on June 18, 2014, and 43 individuals primarily representing industry representatives and NRC staff on June 19, 2014. Of the 60 participants on June 18, 2014, 26 participated in the meeting through audio teleconferencing and webinar. The transcripts for the public meeting are available in the Agencywide Documents Access and Management System (ADAMS) under Accession Nos. ML14176B151 and ML14176B161.

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The NRC presentation material is available in ADAMS under Accession No. ML14168A251, "Filtering Strategies Rulemaking 06/18/14 Public Meeting." The industry presentation materials are available in ADAMS under Accession Nos. ML14170A055, ML1417A065, ML14170A104, ML14170A720, "Filtering Strategies Rulemaking Public Meeting – 6/18/14 – Industry Filter Cost Estimate," "Filtering Strategies Rulemaking Public Meeting – 6/18/14 – Industry Rulemaking Analysis," "Filtering Strategies Rulemaking Public Meeting – 6/18/14 – Industry BWR Mark I and II Phase 2 Order Strategy," "Filtering Strategies Rulemaking Public Meeting – 6/18/14 – Industry Hardened Containment Venting Strategy Phase 2," respectively.

The major areas of discussion are summarized below:

NRC Presentation

- Provided preliminary technical evaluations based on the MELCOR analysis and CDET and APET.
 - Matrix on MELCOR runs that were/are being performed and sensitivities that staff is running based on information provided during April 30, 2014 public meeting.
 - Provided preliminary CDET and APET and assumptions. The staff also noted that there other external hazards that are not modeled (e.g., high winds) and would have to be considered qualitatively.
 - One commenter from industry stated that there were some interesting data. The staff responded that they will go back and check the analysis.
 - Another comment from industry was that it appears that the CDET and APET between industry and NRC are similar with the differences from the numbers used in the human reliability assessment.
- Provided initial thoughts on the use of qualitative factors.
 - Based on the allowances within the status quo, the staff's initial thought to use qualitative factors is to use analytical tools to enhance the use of qualitative factors.
 - The staff presented a break-even analysis and a decision matrix as two examples of tools that could be used within the draft regulatory basis.
 - The use of these tools is contingent on the Commission's vote on Qualitative Factors due to the Commission in July 2014.

Industry Presentation

- Provided detailed cost estimates.
 - Provided information based on NEI letter provided on May 31, 2014 (ADAMS Accession No. ML14134A055).
 - Information is based on receiving input from two-thirds of the representative fleet.
 - Costs for the filters came from discussions with vendors and ranged from \$10 – 15 million.
 - The detailed cost estimate was informed by Tepco's installation of filters in Japan. In response to a staff query, industry stated that the cost estimate is not informed by the more recent installation of filters in Canada.
 - Industry recommended using the cost estimate numbers with the 50 percent contingency as the baseline cost.
- Provided preliminary technical evaluation.

- Provided information based on relative analyses due to the information being preliminary.
- Provided that significant amount of relative benefit is from the introduction of water and that there is little relative benefit from the use of a filter.
- Provided concepts, milestones, and deliverables for EA-13-109 Phase 2 on June 19, 2014.
 - Introduced terminology of Severe Accident Water Addition (SAWA) and Severe Accident Water Management (SAWM).
 - Provided milestones and deliverables for EA-13-109 Phase 2.
 - Stated that drywell vent temperatures would need alignment between NRC and industry in the July/August 2014 timeframe to meet the EA-13-109 Phase 2 milestones.

Takeaways

- NRC
 - Provide additional information in relation to the regulatory problem and objective, including more discussion on the performance goals at the next public meeting.
 - Ensure that breakdown of information in relation to the PRA event trees are correct.
 - Resolve differences between assumed numbers of safety relief valves needed to be cycled.
 - Provide list of alternatives, with numbers that will be used in the future for discussions.
 - Provide clarification on information requested as part of the May 22, 2014 NRC letter to NEI in relation to human reliability assessment.
 - Discuss the MELCOR Accident Consequence Code System (MACCS) information in greater detail at the following public meeting, including providing information on BWR Mark II.
- Industry
 - Provide cost information on changes in cost to decommissioning and operating and maintenance due to implementation of alternatives.
 - Provide criteria for decision to deploy, time to deploy, and time within accident for FLEX equipment.
 - Provide fraction of hydrogen based on location within containment (e.g., in-vessel, suppression chamber, drywell) and outside of containment (e.g., reactor building, released out the vent) during the analyzed severe accident.

Enclosure:
List of Attendees

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Enclosure:
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Accession Nos.: Pkg.: ML14176B132; Notice: ML14155A009; Summary: ML14176B213
Transcripts: ML14176B151 (1-99), ML14176B161 (1-273); Presentation Materials:
ML14168A251, ML14170A055, ML1417A065, ML14170A104, ML14170A720 NRC-001

OFFICE	DPR/PRMB	DPR/PRMB	DPR/PRMB	DPR/PRMB
NAME	ASzabo (FSchofer for)	GLappert (w/comments)	TInverso	ASzabo
DATE	07/07/2014	7/10/2014	7/15/14	7/15/14

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LIST OF MEETING ATTENDEES

Day 1 – June 18, 2014	
Name	Organization
Aaron Szabo	NRC
Jana Bergman	Sciencetech
Jerry Bonanno	NEI
Steven Kraft	NEI
Ed Fuller	NRC
Nageswara Karipineni	NRC
Bob Dennig	NRC
Jerome Bettle	NRC
Jeff Gabor	ERIN
Rick Wachowiak	EPRI
Shayne Tenace	Exelon
Martin Stutzke	NRC
William Orders	NRC
Hossein Esmaili	NRC
Karl Sturzebecker	NRC
Raj Auluck	NRC
Phil Amway	Exelon
Bob Cowen	GE Hitachi
Randy Bundt	BWROG/SNC
Patrick Fallon	DTE Energy
Mike Crowthers	PPL Susquehanna
Doug True	ERIN
Tim McGinty	NRC
Brett Titus	NRC
Fred Schofer	NRC
Weidong Wang	ACRS staff
Richard Lee	NRC
James Shea	NRC
Y. James Chang	NRC
John Lane	NRC
Terri Farthing	GE Hitachi
Jonathan Barr	NRC
Randy Sullivan	NRC
Richard Rogalski*	Not provided
Harold Trenka*	Exelon Nuclear
Al Haeger*	Not provided
Dan Jacobsen*	Entergy Operations Inc
Dale Wuokko*	Toshiba America
Frank Loscalzo*	TVA – BFNP
Kenneth Putnam*	Not provided
Neil Sheehan*	Not provided
Necdet Kurul*	GE Hitachi

Name	Organization
Edward Bates*	Fukushima Response
Nandu Patankar*	Not provided
Mary Presley*	Not provided
Ed Burns*	ERIN Engineering and Research, INC
Douglas Culver*	Energy Northwest
Cathy Cook*	Not provided
Tina Ghosh*	NRC
Albert Cooke*	Design Projects – BFNP
Robert Ginsberg*	Not provided
Yuya Aoyagi*	Not provided
Al Nota*	NRC
Paul Gunter*	Beyond Nuclear
Timothy Devik*	PSEG Nuclear, LLC
Lauren Gibson*	NRC
David Mosby*	Not provided
Rodney Dee*	Safety Enhancements
Glen Seeman*	GE Hitachi
Dan Ludwig*	Not provided
* attended via teleconference	
Day 2 – June 19, 2014	
Aaron Szabo	NRC
Jana Bergman	Scientech
Steven Kraft	NEI
Nageswara Karipineni	NRC
Sher Bahadur	NRC
Jerome Bettel	NRC
Ed Fuller	NRC
Maria Korsnick	Exelon
Phil Amway	Exelon
Martin Stutzke	NRC
Karl Sturzebecker	NRC
Rick Wachowiak	EPRI
Raj Auluck	NRC
Patrick Fallon	DTE Energy
Terri Farthing	GE Hitachi
Doug True	ERIN
Jeff Gabor	ERIN
Hossein Esmaili	NRC
James Shea	NRC
Weidong Wang	ACRS staff
Brett Titus	NRC
Bob Dennig	NRC
Greg Krueger	Exelon
Douglas Culver*	Energy Northwest
Aby Mohseni*	NRC

Name	Organization
Al Haeger*	Not provided
Robert Ginsberg*	Not provided
Lisa Matis*	Tetra Tech
Kenneth Putman*	Not provided
Necdet Kurul*	GE Hitachi
Al Nota*	NRC
Edward Bates*	NMP Fukushima Response
Ed Burns*	ERIN Engineering and Research, Inc
Robert Sanders*	Areva
Dan Jacobsen*	Entergy Operations Inc
Rodney Dee*	Safety Enhancements
Dale Wuokko*	Toshiba America
Yuya Aoyagi*	Not provided
Harold Trenka*	Exelon Nuclear
Timothy Reed*	NRC
Frank Loscalzo*	TVA BFN
Bob Cowen*	GE Hitachi
Richard Rogalski*	Not provided
* attended via teleconference	