

July 28, 2004

MEMORANDUM TO: Brian W. Sheron, Associate Director
for Project Licensing and Technical Analysis
Office of Nuclear Reactor Regulations

FROM: Timothy E. Collins */RA/*
Program Management, Policy Development
and Planning Staff
Office of Nuclear Reactor Regulations

SUBJECT: SUPPORT WITHIN THE OFFICE OF NUCLEAR REACTOR
REGULATION AND THE OFFICE OF NUCLEAR REGULATORY
RESEARCH FOR THE COMPLETION OF THE PROPOSED
RULEMAKING TO RISK-INFORM 10 CFR 50.46, OPTION 3

We have coordinated support between the Office of Nuclear Regulatory Research (RES) and the Office of Nuclear Reactor Regulation (NRR) to develop the technical results and insights needed to risk-inform 10 CFR 50.46. The attachment to this memorandum provides a list of the activities that will be performed, including due dates to achieve success.

NRR and RES have committed to dedicate the resources needed to accomplish the work on a schedule that supports completion of the proposed rulemaking package by December 31, 2004. This effort is considered high priority. This memorandum was concurred in by the division directors involved in resolving these issues and was approved by the 50.46 Steering Committee.

Attachment: As stated

cc: J. Dyer, NRR
C. Paperiello, RES

CONTACT: Glenn Kelly, NRR/DSSA
415-1075

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OFFICE	SPAB	E	SC :SPSB	BC: SPSB	D: DSSA
NAME	GKelly		MRubin	MTschiltz	SBlack: (MJohnson for)
DATE	6/17/04		6/17/04	6/21/04	7/14/04

OFFICE	D: DE	DSARE:RES	D: RES/DRAA	D: RES/DET	NRR
NAME	RBarrett: (CGrimes for)	FELTAWILA	CAder	MMayfield	TCollins
DATE	7/ 22 /04	7/ 22 /04	7/ 22 /04	7/ 22 /04	7/ 28 /04

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Scope and Schedule for Tasks

NRR and RES have agreed to complete the following as part of developing the proposed rulemaking to risk-inform 10 CFR 50.46. (Lead organizations in RES and NRR are highlighted in italics. The first organization listed has responsibility to write up the area for the proposed rule making.)

Expert Elicitation

Due Dates: Preliminary development (6/22/2004), written conceptual basis (7/1/04), detailed technical basis (8/12/04)

(A) technical rationale supporting the use of the expert elicitation results to form part of the technical basis for 50.46 rulemaking. This should include a justification of the use of expert elicitation to evaluate LOCA frequencies and a discussion of the scope and limitations of the elicitation effort. (*DET (R Tregoning)*, *DE (G Hammer)*, *SPSB (G Kelly)*)

(B) continuous curves plotting LOCA frequency versus break size, with corresponding tables of values, of the median, mean, and 95th percentile. A technical description should be provided for the various statistical quantities (e.g., arithmetic mean, geometric mean, trimmed geometric mean, 95th percentile) and data adjustments (e.g., overconfidence adjustment) used to develop a metric for risk-informed decision making. The following curves and the associated 95% confidence intervals should be provided:

- 1) using the arithmetic mean from all experts providing results
 - 2) using the arithmetic mean from all experts and combining the experts' frequency distributions
 - 3) using the above two techniques and including correction factors for overconfidence.
- (*DET (R Tregoning)*, *SPSB (S Dinsmore)*, *DE (D Fischer)*).

(C) Discuss uncertainties in the elicitation results and how these factor into the selection of an appropriate risk metric for choosing an alternative design basis break size. (*DET (R Tregoning)*, *DE (G Hammer)*, *SPSB (G Kelly)*)

(D) Provide a clear explanation of how the results reported by the expert panel were converted into the LOCA frequency versus break size curves. (*DET (R Tregoning)*, *DE (G Hammer)*, *SPSB (S Dinsmore)*)

Contribution of Consequential LOCAs

Due Dates: Preliminary development (6/24/2004), written conceptual basis (7/1/04), detailed technical basis (8/12/04)

(A) Evaluate the risk impact of consequential LOCAs and utilize information in adjusting the alternative design basis break size based initially on the expert elicitation results. If generic adjustments to the design basis break size are not possible, develop a plant-specific

methodology for considering the risk impact of significant consequential LOCAs within the decision-making process. Specific consideration in (A) should be given to the following consequential LOCA sources: heavy load drop (*DET (R Tregoning)*, *SPLB (S Jones)*, *SPSB (G Kelly)*); seismic, (*SPSB (G Kelly)*, (*DET (R Tregoning)*); ISLOCAs, (*DE (G Hammer)*, *SPSB (G Kelly)*), and water-hammer (*DSARE (D Bessette)*, *SRXB (J Uhle)*, *SPSB (G Kelly)*). The water hammer consideration should address NUREG/CR-3895 concerns regarding SBLOCAs causing water hammer leading to LBLOCA. Other consequential LOCAs modeled in PRAs that lead to passive component LOCAs may also need to be considered.

(B) Other active system LOCAs (e.g. stuck open valves, pump seals) should also be considered in the selection of the alternative design basis break size. (*DET (R Tregoning)*, *DE (G Hammer)*)

Determine Adequacy of Proposed Plant Modifications

Due Dates: Preliminary development (6/24/2004), written conceptual basis (7/1/04), detailed technical basis (8/12/04)

(A) Develop criteria based on RG 1.174 and clarify the use of guidelines and principles in RG 1.174 to determine if plant changes to be made under this proposed rule are acceptable. RES will provide technical support, as needed, and will assist NRR in preparing a written summary of this effort. (*SPSB (G Kelly)*, *DRAA (H Hamzehee)*, *DE (TBD)*)

Defense-In-Depth

Due Dates: Preliminary development (6/24/2004), written conceptual basis (7/1/04), detailed technical basis (8/12/04)

(A) Clarify and provide guidance, as necessary, on how the DID principles described in RG 1.174 can be used to support the 50.46 proposed rulemaking. RES will provide technical support, as needed, and will assist NRR in preparing a written summary of this effort. ((*SPSB (G Kelly)*, *DRAA (H Hamzehee)*, *DE (TBD)*)

Mitigation

Due Dates: Preliminary development (6/22/2004), written conceptual basis (7/1/04), detailed technical basis (8/12/04)

(A) coordinate with NRR to produce recommended metrics and criteria that reasonably assure mitigation success for LOCA break sizes between the new maximum design basis LOCA and the double ended guillotine break, once NRR has determined the needed level of mitigation for such breaks. (*SRXB (J Uhle)*, *DSARE (S Bajorek)*, *SPSB (G Kelly)*)

(B) a discussion of what documentation licensees should provide to demonstrate adequate mitigation capability. Provide a discussion of where (e.g., as part of the license, in the Final

Safety Analysis Report, in a new part of NRC regulations, as part of SAMGs) such mitigation capability should be regulated and why. (SRXB (J. Uhle), DE (TBD), SPSB (G. Kelly))

Cumulative Risk Limits

Due Dates: Preliminary development (6/24/2004), written conceptual basis (7/1/04), detailed technical basis (8/12/04)

(A) Determine how to effectively and efficiently track total plant risk and cumulative changes in risk from plant changes (either made under this rule or all plant changes including those made under 50.59). RES will provide technical support, as needed, and will assist NRR in preparing a written summary of this effort. (SPSB (G Kelly), DRAA (H Hamzehee))

Tentacles

Due Dates: Preliminary development (6/15/2004), written conceptual basis (7/1/04), detailed technical basis (8/12/04)

(A) a list of structures, systems, and components, plant operations, plant maintenance, and NRC regulations that might be affected if the maximum design basis LOCA break size were decreased; a discussion of some ways in which the SSCs might be changed; and a discussion of the implications of these changes. (SRXB (J Uhle), DE (TBD), (SPSB) (G Kelly))

PRA Quality

Due Dates: Preliminary development (6/24/2004), written conceptual basis (7/1/04), detailed technical basis (8/12/04)

Consistent with the SRM on PRA quality phased approach and staff's action plan, determine the required PRA quality and scope for supporting the proposed 50.46 rule-making. Provide recommendations and justification for how plants with non-full scope PRAs (especially in seismic, fire, and shutdown) should or could provide numerical estimates for changes in CDF, LERF. RES will provide technical support, as needed, and will assist NRR in preparing a written summary of this effort. (SPSB (S Dinsmore), DRAA (H Hamzehee))

Treatment

Due Dates: Preliminary development (6/24/2004), written conceptual basis (7/1/04), detailed technical basis (8/12/04)

(A) a discussion of how "treatment" could be allowed to change for SSCs formerly needed to mitigate large LOCAs, but no longer needed to mitigate LOCAs up to the new risk-informed design basis LOCA size. The discussion should include Appendix B considerations, EQ, IEEE-

279 type considerations, Technical Specifications, seismic, and other areas that might be affected. (*DE (TBD)*, *SPLB (S Jones)*, *SPSB (S Dinsmore)*)

Monitoring

Due Dates: Preliminary development (6/24/2004), written conceptual basis (7/1/04), detailed technical basis (8/12/04)

(A) Prescribe the areas to be monitored by licensees to assure that the underlying assumptions and insights on which this rule is based continue to be true on a plant-specific basis. Provide a discussion of the reporting needs by licensees to the NRC. (*DE (TBD)*, *RES (TBD)*, (*SPSB (S Dinsmore)*)

Long-Term Issues

Due Dates: Final rule

(A) Finalize the technical basis supporting the expert elicitation results including the publication of the NUREG report which fully documents the elicitation process and any external review which is conducted on the elicitation methodology or in the processing of the results from multiple experts. (*DET (R Tregoning)*, *DE (TBD)*, *SPSB (S Dinsmore)*)

(B) In the long term, a discussion of whether additional benchmarking of codes is needed against phenomena associated with arresting a core melt. (*DSARE (S Bajorek)* *SRXB (J Uhle)*, *SPSB (S Dinsmore)*)

(C) A discussion of metrics that could be added to RG 1.174 guidance, for example, late containment failure, to help determine adequacy of defense-in-depth (DID) (*SPSB (G Kelly)*, *RES (TBD)*, *DE (TBD)*, *SRXB (J Uhle)*)

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