

October 1, 2002

MEMORANDUM TO: Mark A. Cunningham, Chief
Probabilistic Risk Analysis Branch
Division of Risk Analysis & Applications
Office of Nuclear Regulatory Research

THRU: Mary T. Drouin, Section Leader
Probabilistic Risk Analysis Branch
Division of Risk Analysis & Applications
Office of Nuclear Regulatory Research

FROM: Alan S. Kuritzky / RA /
Probabilistic Risk Analysis Branch
Division of Risk Analysis & Applications
Office of Nuclear Regulatory Research

SUBJECT: SUMMARY OF JUNE 20, 2002, PUBLIC MEETING WITH
NUCLEAR ENERGY INSTITUTE (NEI), BOILING WATER
REACTOR OWNERS' GROUP (BWROG) AND OTHER
INTERESTED STAKEHOLDERS REGARDING POTENTIAL
CHANGES TO 10 CFR 50.46 (LOCA-LOOP REQUIREMENT)

The NRC staff hosted a public meeting on June 20, 2002, at the request of NEI, to allow stakeholders the opportunity to provide their ideas for making risk-informed changes to the ECCS reliability requirements, principally changes to the current requirement to postulate a loss of offsite power (LOOP) when performing thermal-hydraulic calculations to demonstrate meeting the emergency core cooling system (ECCS) acceptance criteria stipulated in 10 CFR 50.46. NEI also requested that the staff discuss its progress in proceeding with risk-informed changes to the ECCS reliability requirements. This meeting was one in a series of public meetings and teleconferences held with stakeholders on this subject. The agenda for the meeting is available under ADAMS Accession Number ML021690687. The principal topics of discussion included:

- Electric Power Research Institute (EPRI) conditional LOOP probability report
- Potential benefits from relaxing the LOCA-LOOP requirement
- Single failure criterion
- LOCA frequencies
- Industry-NEI contacts on Option 3 activities

Each of these topics is discussed below. Attachment 1 contains the list of meeting attendees.

EPRI Conditional LOOP Probability Report

On April 27, 2002, NEI provided the staff with a report on the results of an EPRI expert elicitation process used to estimate the probability of a LOOP given a large loss of coolant accident (LOCA) (ADAMS Accession Number ML021270019). During a public meeting between the staff and stakeholders on May 2, 2002, the staff agreed to review and provide comments on the EPRI expert elicitation report. A single NRC staff member and one contractor reviewed the report and provided comments (ADAMS Accession Number ML021650533) specifically for the purpose of facilitating additional discussion on this topic. The discussion at the meeting focused on the following areas:

State estimators/LCOs. Industry representatives stated that a number of nuclear plants now have the benefit of state estimators for assessing the condition of the grid. State estimators, which are run by the grid operator, monitor the power conditions affecting the grid, as well as different contingencies, and allow the grid operator to inform the plant whenever the plant is vulnerable to losing offsite power in the event of a LOCA. Typically, plants would then enter into a limiting condition of operation (LCO), and the technical specifications would allow some time for the grid operator to decrease local load or improve the conditions of the grid. A member of the NRC staff noted that in order to estimate the conditional LOOP probability, a record would be needed of the amount of time a plant spent in the vulnerable condition. An industry representative responded that the plant would typically enter an LCO for these conditions, and there would be a record of how often the plant entered the LCO.

Notification of the plant by the grid operator based on the conditions assessed by the state estimator is typically included in the transmission control agreement (TCA) between the plant and its grid operator. An EPRI representative stated that while it varies from system to system, the TCAs typically include some incentives or penalties for the grid operator to help ensure minimal vulnerability at the nuclear plant. A member of the NRC staff noted that credit for a state estimator is contingent upon maintaining of the TCA.

It was also noted that implementing TCAs and state estimators is a good step towards improving safety and decreasing the probability of a LOOP after a LOCA. Currently only a small number of plants have the benefit of state estimators with the capability for on-line contingency analysis, though there is a growing trend to implement this capability. On the other hand, since state estimators with this capability have only recently been implemented, it is difficult to quantitatively account for their effect on the conditional probability of a LOOP after a LOCA.

Automatic voltage regulating devices. The written comments provided by the NRC on the EPRI expert elicitation stated that if a plant had a means of regulating safety bus voltages (e.g., an auto load tap changing transformer), then it would seem to make the potential for a conditional LOOP following a LOCA due to degraded voltage less likely, whether due to human/analysis errors or actual degraded voltage conditions. An industry representative commented that plants that have auto load tap changing

transformers typically need them to compensate for some other limitation or concern, and that if a plant were dependent on an auto load tap changing transformer, then this would have a negative impact on conditional LOOP probability because it would introduce additional failure modes. Another industry representative mentioned that most auto load tap changing transformers are of the old mechanical design and take too long to operate to be of much use for correcting for degraded grid voltage problems; however, a number of plants (probably less than 10 percent, but growing) have changed out all of their transformers to new high-speed auto load tap changing transformers, which are much quicker and much more reliable.

Transfer of power source. An EPRI representative agreed with the NRC comment that plants typically either operate all their safety buses directly from offsite power, or operate them all from unit auxiliary transformers connected directly to the output of the main generator.

Human error in the system voltage analysis. An EPRI representative indicated that established human reliability analysis techniques had been employed to arrive at the estimate of 0.003 for this human error.

Failure models (HEPs, etc.). A number of the written comments provided by the NRC on the EPRI expert elicitation addressed the various equipment failure modes and human errors considered by the expert panel. For a number of these cases, industry representatives noted their belief that the subject failure modes or human errors were accounted for in the existing data on conditional LOOP following a reactor trip (i.e., the failure modes or human errors in question would be equally as likely to occur following a reactor trip as following a LOCA). Specifically for the human error associated with failure to translate design requirements into the plant (Item 4 in the EPRI expert elicitation report), an EPRI representative stated that the experts were not comfortable quantifying an error of this nature, and that they felt that the potential for an error of this type should be addressed deterministically.

Potential Benefits From Relaxing the LOCA-LOOP Requirement

Industry reiterated that a figure provided at a previous public meeting (last viewgraph from ADAMS Accession Number ML013370171) identifies most of the unnecessary burden reduction benefit associated with relaxation or removal of the LOCA-LOOP requirement. Industry pointed out that the integrated LOOP/safety injection test involves tremendous staff resources, involves a very large number of test procedures and variations, and is usually on the critical path. Industry noted that while elimination of the requirement to consider a coincident LOOP with a large-break LOCA would not completely remove the burden associated with this test, it would significantly reduce it.

Industry identified the following additional benefits related to relaxation of the LOCA-LOOP requirement:

- A more efficient diesel generator load sequencing scheme could be employed (e.g., longer-term load requirements, such as suppression pool or shutdown cooling, could be loaded later)
- The conditional probability of a consequential LOOP would be decreased by spreading out the loading of ECCS equipment on to the emergency bus
- The focus of the operators would be on more probable events (i.e., more risk-significant accident scenarios)

An NEI representative stated that industry's principal goal for this effort is to obtain greater operational flexibility (e.g., reduction in test and maintenance frequency or maintenance rule target reliability), not to remove equipment from the plant. However, the same representative commented that he believed that the proposed alternative rule should not be written so as to preclude the possibility of removing equipment from the plant.

An NRC staff member commented that there may be a public confidence issue associated with removal of equipment, or the crediting of non-safety-related equipment to allow relaxation or removal of safety-related equipment, and that this may need to be raised as a policy issue.

Single Failure Criterion

A representative from NEI stated their belief that equipment reliability and availability are already monitored by use of the existing risk-informed performance indicators and paragraph (a)(4) of the Maintenance Rule (10 CFR 50.65), and, therefore, the ECCS thermal-hydraulic performance analyses do not require the assumption of a single failure, and the single failure criterion can simply be removed from the regulation. The NEI representative commented that if the removal or risk-informing of the single failure criterion were to be more complicated than that, industry would prefer the LOCA-LOOP requirement to be addressed separately from the single failure criterion.

LOCA Frequencies

An NRC staff member confirmed that the LOCA frequency distributions obtained as part of the near-term staff elicitation (as presented at the ACRS meeting on May 31, 2002) are the values being used internally by the staff in evaluating the practicality of the generic approach to risk-informing the ECCS reliability requirements. The NRC staff member also noted that work has begun on the logistics associated with the formal expert elicitation panel, which will be used to obtain LOCA frequency distributions for use in any potential rulemaking associated with a risk-informed alternative to the ECCS reliability requirements. A kick-off meeting for the formal expert elicitation panel is anticipated to occur in late summer or early September 2002.

Industry-NEI Contacts on Option 3 Activities

Due to the many separate parts of the various ongoing Option 3 activities, and the different lead individuals or organizations involved, the NRC staff and NEI agreed to exchange lists of relevant contacts for each part of the ongoing Option 3 activities.

Attachment: List of Attendees

Project No. 689
cc: See next page

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Central Files ACRS (A. Cronenberg) OGC (G. Mizuno) M. Drouin
A. Kuritzky PRAB r/f

Email

RES:	S. Newberry	NRR:	S. Lee (ssl)	Other:	B. Ibrahim, NMSS
	N. Chokshi		D. Diec		OPA
	P. Baranowsky		S. West		G. Martinez-Guridi, BNL
	M. Cheok		J. Lazevnick		J. Lehner, BNL
	E. Hackett		G. Kelly		J. LaChance, SNL
	D. Jackson		S. Dinsmore		A. Camp, SNL
	R. Tregoning		M. Rubin (mpr)		E. Haskin, ERI
	C. Fairbanks		R. Dennig		A. Heymer, NEI
	J. Vora		M. Mitchell		
	D. Overland		M. Kowal		
	A. Singh		W. Scott		
	H. Hamzehee		J. Tatum		
	S. Bajorek		T. Scarbrough		
	N. Lauben		F. Orr		
	W. Raughley		P. Wen		
			A. Wang		

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OFFICE	DRAA/PRAB		DRAA/PRAB		DRAA/PRAB				
NAME	AKuritzky		MDrouin		MCunningham				
DATE	8/ 2 /2002		8/ 20 /2002		10/ 1 /2002				

cc: Mr. Ralph Beedle
Senior Vice President
and Chief Nuclear Officer
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. Alex Marion, Director
Engineering
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. Anthony Pietrangelo, Director
Risk and Performance-Based Regulation
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. James M. Kenny, Chairman
BWR Owners Group
PPL, Inc.
2 North Ninth Street, M/C A6-1
Allentown, PA 18101

Mr. J. A. Gray, Jr., Vice Chairman
BWR Owners Group
New York Power Authority
123 Main Street
White Plains, NY 10601

LIST OF PARTICIPANTS POTENTIAL CHANGES TO 10 CFR 50.46 (LOCA-LOOP REQUIREMENT) JUNE 20, 2002 NEI, BWROG, OTHER STAKEHOLDERS			
Name	Title	Telephone	Organization
Tony Browning	Sr. Licensing Engineer	(319) 851-7750	NMC-Duane Arnold/ BWROG
Bob Dennig	Section Chief, TSS	(301) 415-1156	NRC/NRR/DRIP/RORP
David Diec	Project Manager	(301) 415-2834	NRC/NRR/DRIP/RPRP
Stephen Dinsmore	Rel. and Risk Analyst	(301) 415-8482	NRC/NRR/DSSA/SPSB
Mary Drouin	Section Chief	(301) 415-6675	NRC/RES/DRAA/PRAB
John Gaertner	Risk Specialist	(704) 547-6169	EPRI
Wayne Harrison	Sr. Staff Licensing Eng.	(361) 972-7298	STPNOC
Adrian Heymer	Project Manager	(202) 739-8094	NEI
Rick Hill	Project Manager	(408) 925-5388	GE
Roger Huston	Principal	(703) 671-9738	Licensing Supp. Services
Bakr Ibrahim	Seismologist	(301) 415-6651	NRC/NMSS/DWM/HLWB
Glenn Kelly	Sr. Rel. and Risk Anal.	(301) 415-1075	NRC/NRR/DSSA/SPSB
Alan Kuritzky	Sr. Rel. and Risk Engr.	(301) 415-6255	NRC/RES/DRAA/PRAB
Norm Lauben	Sr. Nuclear Engineer	(301) 415-6762	NRC/RES/DSARE/SMSAB
Jim Lazevnick	Sr. Electrical Engineer	(301) 415-2782	NRC/NRR/DE/EEIB
Gerardo Martinez-Guridi	Research Engineer I	(631) 344-7907	Brookhaven National Laboratory
Steven E. Mays	Manager, Risk Tech.	(703) 404-3337	ERIN Engineering
Mark Rubin	Section Chief, PRA	(301) 415-3234	NRC/NRR/DSSA/SPSB
Wayne Scott	Sr. Operations Engr.	(301) 415-1020	NRC/NRR/DIPM/IEHB
Rob Tregoning	Materials Engineer	(301) 415-6657	NRC/RES/DET/MEB
Kiang Zee	Manager, App. ENOR	(925) 943-7077	ERIN Engineering
Via Telecon:			
Morris Byram	Senior Lead Engineer	(479) 858-4662	Entergy Operations

LIST OF PARTICIPANTS
POTENTIAL CHANGES TO 10 CFR 50.46 (LOCA-LOOP REQUIREMENT)
JUNE 20, 2002
NEI, BWROG, OTHER STAKEHOLDERS

Name	Title	Telephone	Organization
Gerry Nicely	Sr. Electrical Specialist	(423) 751-8236	TVA
Frank Rahn	Project Manager	(650) 855-2037	EPRI
Michael Tucker	Senior Engineer	(630) 657-3908	Exelon