

February 26, 2003

MEMORANDUM TO: Christopher I. Grimes, Director
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

FROM: Joseph L. Birmingham, Project Manager */RA/*
Policy and Rulemaking Program
Division of Regulatory Improvement Programs, NRR

SUBJECT: SUMMARY OF FEBRUARY 19, 2003 PUBLIC WORKSHOP ON
RISK-INFORMING POST-FIRE SAFE-SHUTDOWN CIRCUIT
ANALYSIS INSPECTION

On February 19, 2003, Nuclear Regulatory Commission (NRC) staff held a facilitated public workshop to discuss criteria for risk-informing post-fire safe-shutdown circuit analysis inspection. The workshop had been noticed in the Federal Register on December 27, 2002 (67 FR 79168). Meeting attendees are listed in Attachment 1. Presentation material by the NRC is Attachment 2 (ADAMS Accession No. ML030560068) and presentation material by industry is Attachment 3 (ADAMS Accession No. ML030560179). A meeting transcript is available under ADAMS Accession No. ML030620006.

The meeting was conducted in a round-table format with speakers invited from stakeholder groups seated at the main table. Representatives of industry, interested contractors, national laboratories, and the Nuclear Energy Institute (NEI) were present at the table.

Mr. "Chip" Cameron, of the NRC Office of the General Counsel, was the workshop facilitator. Mr. Cameron welcomed all of the meeting participants and, after noting that inclement weather had been a challenge for people to attend the workshop, asked for introductions. After introductions, Mr. Cameron stated that his purpose as facilitator was to allow everyone an opportunity to comment and be heard and to hear and ask questions on the comments from others.

Mr. John Hannon, Chief of the NRC Plant Systems Branch, added his appreciation to the effort people had made to attend and stated that the overall purpose of the workshop was to identify the characteristics of risk-significant circuits so that guidance could be developed to NRC inspectors to resume inspections of associated post-fire safe-shutdown circuits. He noted that the NRC schedule to end the enforcement guidance memorandum for these circuits was October 2003. This period would allow time for the staff to develop criteria and guidance and to provide needed training. Industry asked if the draft guidance would be available for review and Mr. Hannon indicated that it would be posted on the NRC's fire protection website. Mr. Hannon then introduced Mr. Eric Weiss Section Chief of the NRC Plant Systems Branch.

Mr. Weiss presented a review of the regulatory history related to associated circuits and stated that a primary goal of the workshop was to identify associated circuits that were risk significant, circuits that were not risk significant, and circuits that deserved further analysis before a determination could be made. He described this process as putting the circuits into bins so that

guidance could be developed to inspectors so that inspector resources could be most efficiently employed. He noted that nothing in the workshop would change a licensee's licensing basis or NRC regulations. He said that this was the most effective way the NRC could ensure public health and safety in this area. Mr Weiss then presented the material in Attachment 2 of this memorandum. In his presentation, Mr. Weiss identified the applicable regulations, provided a definition of associated circuits, gave an example of an associated circuit, and concluded that the workshop would be a success if it provided criteria so that the NRC could resume inspections and focus on the most risk-significant circuits.

Mr. Weiss's presentation was followed by a question and answer session. Topics discussed included how associated circuits fit into the significance determination process (SDP), that a risk-significant circuit at one plant might not be risk-significant at another facility, and what is the appropriate level of detail to identify risk-significant circuits. After discussing these topics, the group discussed what should an inspector consider first when beginning to inspect associated circuits. There was general agreement that, after identifying the affected systems, an inspector should consider consequences, such as a flow diversion path, that, as a result of a fire, could lead to core damage or the inability to achieve hot shutdown. There were various opinions on what should be considered a severe consequence. For example, one participant pointed out that some scenarios may not lead directly to increased core damage frequency or to a larger early release frequency but could cause a significant degradation of the shutdown system. There was significant discussion on the importance of frequency. The group agreed that frequency was an important factor but that an inspector would not likely know the frequency until after identifying the potential fault path. Therefore, the guidance to inspectors needed to be such that the inspectors could implement the guidance with the amount of resources allocated. The guidance should have broad criteria that indicated the circuits that were risk significant and the circuits that were low in risk.

Dennis Henneke, of Duke Power, stated that the criteria to rank circuits should have physical, functional, and electrical attributes. Roy Fuhrmeister, of NRC Region I, said that typical guidance to inspectors was to identify systems with the potential to degrade the dedicated shutdown systems, look at drawings to identify circuits, and then to look in the field at the installation and the fire areas. He further indicated that, if three or more faults were needed to cause a maloperation, the inspector's time was probably better used looking at other potential problems. Ken Sullivan, of Brookhaven National Laboratories, pointed out that inspectors needed a definition of what is unacceptable, core damage or inability to meet performance parameters. For example, a plant may be able to shutdown safely even though a circuit failure caused a small flow diversion path in a large pipe header. In general, the group agreed that it was important to fix circuits that adversely affected performance parameters but that inspectors would likely focus on scenarios that could lead to core damage.

Mr. Fred Emerson, of NEI, made a presentation that included (1) industry activities to resolve fire-induced circuit failure issues; (2) the development of industry document NEI 00-01, "Guidance for Post-Fire, Safe-Shutdown, Circuit Analysis;" and (3) industry proposals for the workshop. The last topic included future resolution activities, such as NRC acceptance of NEI 00-01, input to development of revised criteria for resumption of inspection, propose processes for resolution of circuits requiring further study. The last part of Mr. Emerson's presentation were slides describing criteria proposed as a basis for discussion on those types of circuits where inspection was not required and conversely where inspection was required.

These slides and the ranking criteria slide from the NRC presentation served as a basis for much of the discussion on more detailed inspection guidance criteria. The NEI presentation slides are Attachment 3 of this memorandum (Accession No. ML030560179).

Because of data emerging from testing performed by NEI and the Electric Power Research Institute at Omega Point, criteria had been identified that made some cable types and configurations less likely to cause a maloperation as a result of a fire. For example, thermoset jacketed cable was less susceptible to fire than thermoplastic and current limiting devices such as control power transformers reduced the probability of maloperation. More details on the industry proposed criteria are in slides 19-23 of Attachment 3. The group discussed the proposed criteria in these slides and agreed on some features and determined that others required better wording. For example, the group agreed that, in general, armored cable with fuses was not a likely source for maloperation. However, the NRC staff pointed out that criteria such as "Any thermoset cable exposed to a fire less than 450 kW for less than 15 minutes" was not appropriate because it did not capture the temperature and time that the cable was actually subjected to. Cable-to-cable shorts were considered a less likely source of maloperation than shorts within a multiconductor cable. Also, there was general agreement that inspector guidance should indicate that inspection should focus on potential failure paths where two or fewer shorts were required for the maloperation to occur.

The NRC summarized the workshop by stating that the workshop had been effective in identifying attributes of risk-significant circuits as well as attributes of low risk-significant circuits. The staff needed to evaluate further what had been presented at the workshop and would likely have additional discussion with industry on the criteria. The staff would prepare draft guidance for inspection and would post the draft guidance on the NRC Fire Protection website after it had been developed. This action would allow for stakeholder comment on the guidance.

The staff stated that the workshop had achieved the major goal of the workshop, i.e. to develop criteria that could be used as input to risk-informed inspection guidance. The staff thanked all of the participants for attending and for their contributions to the workshop.

Having completed discussion of the agenda items, the workshop was closed.

Project No. 689

Attachments: As stated

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**PUBLIC WORKSHOP ON RISK-INFORMING POST-FIRE
SAFE-SHUTDOWN CIRCUIT ANALYSIS INSPECTION
February 19, 2003**

LIST OF ATTENDEES

<u>NAME</u>	<u>ORGANIZATION</u>
Chip Cameron	OGC/Meeting Facilitator
Suzanne Black	NRR/DSSA
*John Hannon	NRR/DSSA/SPLB
*Eric Weiss	NRR/DSSA/SPLB
Dan Frumkin	NRR/DSSA/SPLB
*Mark Henry Salley	NRR/DSSA/SPLB
J.S. Hyslop	RES/DRAA/PRAB
*Ken Sullivan	Brookhaven National Lab
*Steve Nowlen	Sandia National Lab
Joe Birmingham	NRR/DRIP/RPRP
Roy Fuhrmeister	NRC/Region I
Amarjit Singh	NRC/RES
Gareth Parry	NRC/NRR/DSSA?
Joel E. Rivera-Ortiz	NRC/DSSA/SPLB
Tanya Mensah	NRC/DSSA/SPLB
Sunil Weerakkody	NRC/DSSA/SPLB
Russell Gibbs	NRC/DIPM/IIPB
Naeem Iqbal	NRC/DSSA/SPLB
*Fred Emerson	Nuclear Energy Institute
Andrew Ratchford	RDS
Frank Wyant	Sandia
Matt Turgeon	Sandia
Doug Wood	Advent Engineering
Harold Kohl	First Energy
Saeed Sawar	Constellation Nuc.
Roger Sims	Progress Energy
John Durham	NISYS Corp.
Ron Oates	Appendix R Solutions
*Dennis Henneke	Duke Power
*Kiang Zee	Erin Engineering
*Elizabeth Kleinsorg	Kleinsorg Group
*Chris Pragman	Exelon
Philip Klintworth	Advent Energy
Wade Larson	EPM
*Bob Kalantari	EPM
Francis Pelly	EPM
David J. Buell	OPPD, Fort Calhoun
*Bijan Nijafi	SAIC (rep. EPRI)
Kevin Mathur	PSE&G
Ronald Achon	Framatome
Jeff Eaton	Progress Energy
Paul Gaffney	PGN
David S. Lee	Progress Energy

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Fleur de Peralta
Tom Gormon
Sheldon Trubatch
Charles Willbanks
Doug Brandes
**Charles Payne
**Nancy Chapman

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- * Round Table Participant
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