

October 17, 2000

MEMORANDUM TO: Stuart A. Richards, Director
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: L. Raynard Wharton, Project Manager, Section 2
Project Directorate IV & Decommissioning */RA/*
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF MEETING HELD ON AUGUST 11, 2000, WITH
WESTINGHOUSE ELECTRIC COMPANY (W) TO DISCUSS
DOWNCOMER BOILING

On August 11, 2000, a public meeting was held at the Nuclear Regulatory Commission (NRC) headquarters offices in Rockville, Maryland, between representatives of the Westinghouse Electric Company (W) and the NRC staff. Attachment 1 contains the list of meeting attendees. The meeting agenda and objectives are available under ADAMS accession number ML003758539. Copies of the non-proprietary slides used during the meeting are available under ADAMS accession number ML003758542.

The purpose of the meeting was to discuss predicted downcomer (DC) boiling in emergency core cooling system (ECCS) modeling calculations. During the meeting, W presented information to address staff concerns expressed at a June 28, 2000, meeting. The staff was concerned with the effect of certain models in W evaluation model codes; specifically the effect of incorporating a nozzle gap model and the influence of downcomer modeling.

In a letter dated May 12, 2000, W reported that recent analyses "... have predicted downcomer boiling to occur before the cladding temperature and/or oxidation transients have been conclusively terminated. A method has been developed to extend the transient beyond the onset of DC boiling by correlating the boiling-induced reduction in downcomer driving head to a corresponding reduction in the core inlet flooding rate." This extension is applied to the NRC-approved W Appendix K evaluation model (EM) at the time the EM predicts DC boiling initiation. The EM is not affected prior to initiation of DC boiling. This extension was determined by W to be a discretionary change. It has not been submitted to the NRC for approval.

Duke Power has changed fuel vendors; it is using fuel supplied by W for reloads, and it has analyzed these reloads with the W EM. DC boiling was predicted before the transient was shown to conclusively terminate and the W extension method was used to complete the calculation as summarized in the following table:

Analysis	Item	Prediction using the NRC-approved <u>W</u> EM	Prediction using the <u>W</u> extension method
Analysis of record	DC boiling initiation	295 sec ¹	--
	PCT	~2070°F at ~280 sec	Temperatures no greater than ~2050°F
Different axial power shape	DC boiling initiation	280 sec	--
	PCT	Maximum temperature = ~2020°F at about ~240 sec	~2025°F at ~305 to 320 sec
	Temperature at DC boiling initiation	~1970°F	--

The staff further understands that in no case have calculated results exceeded the 10 CFR 50.46(b) acceptance criteria.

The Duke Power representative stated that (1) Duke is planning to use W extension method calculations with respect to Catawba and McGuire plant startups in the late summer or fall, 2000, (2) Duke plans to change to the 10 CFR 50.46(a)(1)(i) EM in the near future, and (3) Duke would inform NRC of this plan and would provide an implementation date at that time. The Duke representative also expressed concern regarding NRC acceptance of this method for this purpose. Staff representatives at the meeting did not believe it would be a problem to use an unapproved, small PCT-impact assessment tool such as this method to address 10 CFR 50.46(a)(3)(ii) requirements, and stated they would check with their management and the NRC Project Managers to confirm the accuracy of this belief.²

¹Initiation of LOCA is time zero.

²After subsequent internal discussion, the Reactor Systems Branch and the cognizant Project Managers for Catawba, McGuire, and W agreed that, if Duke continues to rely upon the W extension method approach, it should send a letter informing NRC of the plants that are affected, that Duke is performing an assessment in accord with referenced regulations, and that Duke's restart plans will be consistent with the findings from its assessment. The letter should also include a commitment date for implementation of the 10 CFR 50.46(a)(1)(i) EM. Upon receipt of this letter, the NRC would not anticipate that there would be a problem using an unapproved, small PCT-impact assessment tool such as the W extension method to address 10 CFR 50.46(a)(3)(ii) requirements. The NRC additionally notes that its review of the Catawba and McGuire 10 CFR 50.46(a)(1)(i) EM was completed on September 22, 2000.

Typical best-estimate (BE) calculations for plants equipped with the W ice condenser containment indicate that downcomer boiling initiates at about 100 seconds, significantly before PCT is predicted by the Appendix K EM, and causes a PCT increase of 400°F. The BE calculated PCTs were lower than the Appendix K EM calculated PCTs

Project No. 694

Attachment: Meeting Attendees

cc w/atts:

Mr. H. A. Sepp, Manager
Regulatory and Licensing Engineering
Westinghouse Electric Corporation
P.O. Box 355
Pittsburgh, PA 15230-0355

Mr. Andrew Drake, Project Manager
Westinghouse Owners Group
Westinghouse Electric Corporation
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DATE	10/16/00	10/16/00	10/17/00
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OFFICIAL RECORD COPY

MEETING WITH WESTINGHOUSE ELECTRIC COMPANY

ON DOWNCOMER BOILING

AUGUST 11, 2000

MEETING ATTENDEES

<u>NAME</u>	<u>AFFILIATION</u>
R. Landry	NRC
W. Lyon	NRC
F. Orr	NRC
S. Dembek	NRC
R. Wharton	NRC
D. Bessette	NRC
N. Lauben	NRC
B. Harvey	Duke Energy Corporation
R. Schoff	Westinghouse
J. Gresham	Westinghouse
M. Nissley	Westinghouse
L. Ward	ISL, Inc.