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Our ref: LTR-NRC-03-73

December 16, 2003

Subject: Proposed Limits of Applicability for Best-Estimate LOCA Reanalysis Methodology

Reference: LTR-NRC-02-51, "Request for Review and Approval of Proposed Method for Satisfying 10 CFR 50.46 Reanalysis Requirements for Best-Estimate LOCA Evaluation Models," October 9, 2002.

The Reference submitted a proposed methodology for satisfying 10 CFR 50.46 reanalysis requirements for the approved Westinghouse best-estimate large break LOCA methodologies (WCAP-12945-P-A and WCAP-14449-P-A). The staff's review has resulted in a request for Westinghouse to clarify the limits of applicability of the methodology. The attachment contains our response to this request.

When applying the reanalysis methodology to a given plant, Westinghouse will document the basis for concluding that the specific application is within the limits of applicability, and will retain that documentation in our plant records. Concurrence with that conclusion by the engineer currently designated as the Evaluation Model Lead Engineer will be documented as part of those records.

It is our intent to publish the approved version of the reanalysis methodology as Addendum 1 to WCAP-12945-P-A and WCAP-14449-P-A, "Method for Satisfying 10 CFR 50.46 Reanalysis Requirements for Best-Estimate LOCA Evaluation Models."

Please contact Mitch Nissley at (412) 374-4303 if you have any questions concerning this transmittal.

Very truly yours,

B. F. Maurer, Acting Manager
Regulatory Compliance and Plant Licensing

Enclosures

cc: B. J. Benney, NRC (w/3 copies)

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Clarification on Limits of Applicability for Proposed Reanalysis Methodology

The proposed reanalysis methodology will only be applied in circumstances where the fundamental LOCA transient characteristics are unchanged by the error corrections, evaluation model changes, or small changes in expected operating conditions. The fundamental LOCA transient characteristics for a given plant may be described based on its behavior during blowdown and reflood as follows:

Blowdown – Turnaround of the initial hot rod cladding heatup for the reference transient is by one of the following mechanisms:

a) Primarily upward core flow
b) Primarily downward core flow
c) Combination of upward and downward core flow

Reflood – Final turnaround of the hot rod cladding heatup for the reference transient during reflood occurs during one of the following time periods:

a) The initial surge of water into the hot assembly during the first 30 seconds of reflood, prior to boiling in the downcomer
b) Dispersed flow film boiling heat transfer following a period of degraded heat transfer due to boiling in the downcomer

If the fundamental LOCA transient characteristics are unchanged for the reference transient, it is reasonable to assume that changes in transient response due to ranging of the dominant physical phenomena will not be significantly affected, and the proposed reanalysis methodology will be appropriate.

The staff has asked Westinghouse to further delineate those circumstances where the proposed reanalysis methodology may <u>not</u> be applicable. In response to this request, Westinghouse has identified the following examples:

1) The proposed reanalysis methodology is not considered applicable for changes that substantially affect the blowdown cooling behavior. For example, consider a plant in which the blowdown cooling for the reference transient is primarily due to upflow. If the changes result in blowdown cooling for the reference transient that is primarily due to downflow, it would be expected that the propagation of global model uncertainties would be substantially affected by the changes. More specifically, variations in break flow rate or broken cold leg nozzle resistance would be expected to affect blowdown cooling differently than in the previous analysis.

2) The proposed reanalysis methodology is not considered applicable for changes that introduce significant downcomer boiling effects into an analysis that did not previously have them. In this case, the changes would require that the PCT uncertainty be estimated for the late reflood period, which would not have been done in the previous analysis.

3) The proposed reanalysis methodology is not considered applicable for error corrections that obviously invalidate part of the previous uncertainty analysis. An illustrative example would be correction of an error that had over-written the steady state axial power distribution with a uniform distribution at the beginning of the transient. In this example the propagation of power distribution uncertainties established in the previous analysis would obviously not be valid.

Reference:

LTR-NRC-02-51, "Request for Review and Approval of Proposed Method for Satisfying 10 CFR 50.46 Reanalysis Requirements for Best-Estimate LOCA Evaluation Models," October 9, 2002.