Item #4
(3 pages)

Westinghouse
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AEP-00-139
April 27, 2000

Mr. Mike Hoskins
American Electric Power
500 Circle Drive
Buchanan, Michigan 49107

AMERICAN ELECTRIC POWER
DONALD C. COOK NUCLEAR PLANT UNITS 1 AND 2
REACTOR CAVITY AND LOOP SUBCOMPARTMENT – PRESSURE TIME HISTORIES

References:
1. AEP-00-063, " American Electric Power Donald C. Cook Nuclear Plant Units 1 & 2, Reactor Cavity Subcompartment Analysis (CR 99-02649)", 2/15/00
2. AEP-99-369, " American Electric Power Donald C. Cook Nuclear Plant Units 1 & 2, Input for Electronic Corrective Action Plan SN P-99-2650", 10/18/99

Dear Mr. Kingseed,

Westinghouse performed a reanalysis of the reactor cavity and loop subcompartment to include the effects of as-built plant data. The results of these analyses were formally transmitted to American Electric Power (References 1 and 2). Mr. Satyananda Chakrabarti, AEP, recently requested additional information regarding these analyses and clarification of the respective TMD subcompartment analyses. The specific questions asked by Mr. Chakrabarti and the Westinghouse responses to them are contained in the attached letter.

This work was performed under AEP Contract Number C-7693, Release 00-03 (DETR-00-018). Please contact Mr. Don Peck (412-374-2052) or me if you have further questions on this subject.

William R Rice

W. R. Rice
Customer Projects Manager

Attachment

cc: Ken Green - AEP (Buchannon)
Jeff Smetters - AEP (SGRP Grp., D. C. Cook, Unit 1)
Satyananda Chakrbarti - AEP (Buchannon)

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LTR-CRA-00-94

From : Containment and Radiological Analysis
WIN : 284-4079
Date : April 27, 2000
Subject : Donald C. Cook – Reactor Cavity & Loop Subcompartment – Pressure Time Histories

Ref 1) : CN-CRA-00-10-R0, " D. C. Cook Units 1 and 2 (AEP/AMP) – Evaluation of Input Changes to the TMD Reactor Cavity Subcompartment Model", 02/09/2000.
2) : CN-CRA-99-81-R0, " D. C. Cook Units 1 and 2 (AEP/AMP) – Evaluation of Input Changes to the TMD Loop Subcompartment Model", 10/15/1999.
3) : AEP-00-063, "American Electric Power Donald C. Cook Nuclear Plant Units 1 & 2 Reactor Cavity Subcompartment Analysis (CR 99-02649)", 02/15/2000.
4) : AEP-99-369, "American Electric Power Donald C. Cook Nuclear Plant Units 1 & 2 Input for Electronic Corrective Action Plan SN P-99-2650", 10/18/1999.
5) : CN-COA-88-005, "AEP/AMP Thot Reduction Program – Subcompartment Evaluation", 08/3/1988.
6) : CN-CRA-99-94-R0, " D. C. Cook Units 1 and 2 (AEP/AMP) – Evaluation of Input Changes to the TMD Fan/Accumulator Room Subcompartment Model", 10/28/1999.
7) : CN-CRA-99-57-R1, " D. C. Cook Units 1 and 2 (AEP/AMP) – Ice Condenser Blowdown Loads", 11/09/1999.
8) : AEP-99-397, "American Electric Power Donald C. Cook Nuclear Plant Units 1 & 2 Condition Report Number 99-2647 – Fan Accumulator Analysis", 11/3/99.

To: D. E. Peck

cc: E. C. Arnold
W. R. Rice

Westinghouse reanalyzed the reactor cavity and loop subcompartment to include the effects of as-built plant data. Reference 1 and Reference 2 document the analysis. The results were formally transmitted to the customer in Reference 3 and Reference 4.

Mr. Chakrabarti of AEP has recently requested additional input and clarification of the respective TMD subcompartment analyses. Following is a listing of the specific questions and our responses:

1. Required Clarification for Design Margins

Does Westinghouse require a design margin to be applied to the pressures from TMD analyses? If yes, what is the required design margin?

Response

Following is an excerpt from the current Donald C. Cook Nuclear Plant UFSAR:

"The LOCA mass and energy analysis has been performed in accordance with the criteria shown in the Standard Review Plan (SRP) section 6.2.1.3. In this analysis, the relevant requirements of General Design Criteria (GDC) 50 and 10 CFR Part 50 Appendix K have been included by confirmation that the calculated

pressure is less than the design pressure, and because all available sources of energy have been included, which is more restrictive than the old GDC criteria, Appendix H of the original FSAR, to which the Donald C. Cook Plants are licensed. These sources include: reactor power, decay heat, core-stored energy, energy stored in the reactor vessel and internals, metal-water reaction energy, and stored energy in the secondary system.

Although the Donald C. Cook Nuclear Plant is not a standard review plan plant, the containment integrity peak pressure analysis has been performed in accordance with the criteria shown in the SRP Section 6.2.1.1.b, for ice condenser containments. Conformance to GDC's 16, 38, and 50 is demonstrated by showing that the containment design pressure is not exceeded at any time in the transient. This analysis also demonstrates that the containment heat removal systems function to rapidly reduce the containment pressure and temperature in the event of a LOCA."

Similarly for the subcompartment analyses, although the Donald C. Cook Nuclear Plant is not a standard review plan plant, the subcompartment pressure analyses have in general been performed in accordance with the criteria shown in the SRP. Applicable margins are discussed in SRP section 6.2.1.1.b (NUREG-0800 Rev. 2 July 1981), page 6.2.1.1.B-4,

"For plants being reviewed for construction permits, the design differential pressures for all ice condenser control volumes or subcompartments, and system components (e.g., reactor vessel, pressurizer, steam generators) and supports, should provide at least 40% margin above the highest calculated differential pressures. For plants being reviewed for operating licenses, the highest calculated differential pressures for all ice condenser control volumes or subcompartments should not exceed the corresponding design differential pressures."

Research by both AEP and Westinghouse, as part of the review of Condition Reports 99-02649 and 99-2650, determined that there was not a sound basis for all of the input used in the subcompartment analyses. In these instances, the data was recreated. However, the balance of the input, for which adequate documentation existed, was not recreated. This input could be based upon design information, or it could be current, but the status was not verified. The latest subcompartment re-analysis utilized this hybrid set of information. Since it has not been confirmed that all of the TMD input data is as-built information, it is Westinghouse's interpretation that the 40% margin is required. It is also the opinion of Westinghouse that this can be relaxed once all data is verified as being as-built.

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2. Reactor Cavity (Ref. Westinghouse letter AEP-00-058)

Not

a) We need the time history for the peak upper reactor cavity pressure of 79.0 psi.

1.05

Response

Figure 1 illustrates the pressure time history for the upper reactor cavity.

b) We need the time history for the peak missile shield differential pressure of 79.2 psi.

Response

The time history plot for the missile shield differential pressure is not available. However, Figure 1, which illustrates the pressure time history for the upper reactor cavity, and Figure 2, which illustrates the pressure time history for the upper containment, can be used to determine the time history differential pressure.