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Docket Number 50-346

License Number NPF-3

Serial Number 1770

February 13, 1990

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Subject: Response to NRC Bulletin Number 89-03: Potential Loss of Required Shutdown Margin During Refueling Operations

Gentlemen:

This letter is submitted pursuant to 10CFR50.54(f) in response to NRC Bulletin Number 89-03, "Potential Loss of Required Shutdown Margin During Refueling Operations" (Log Number 1-2181 dated November 21, 1989). On January 29, 1990, Toledo Edison contacted Thomas V. Wambach, NRC Senior Project Manager - Davis-Besse Unit Number 1, and discussed the general status of Toledo Edison's response and received verbal concurrence for a two week extension to the 60-day response period. Bulletin Number 89-03 discusses that with longer fuel operating cycles, the enrichment of reload fuel has been increasing which can result in the reduction of the shutdown margin during refueling operations involving intermediate fuel assembly positions. The Bulletin also indicates that although analyses are performed to confirm that the refueling boron concentration is sufficient to maintain the required shutdown margin for the final core configuration, these analyses may not be sufficient to assure the shutdown margin will be maintained for all intermediate fuel positions.

To assure that adequate shutdown margin is maintained during refueling operations, three actions were identified by Bulletin Number 89-03: 1) any intermediate fuel assembly configuration intended to be used during refueling must be identified and evaluated to ensure maintenance of a sufficient refueling boron concentration that results in a minimum shutdown margin of approximately five percent; 2) fuel loading procedures only allow those intermediate fuel assembly configurations that do not violate the allowable shutdown margin; and 3) that these procedures are strictly adhered to, and that the staff responsible for refueling operations is trained in the fuel loading procedures and understand the potential consequences of violating these procedures.

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During refueling operations at Davis-Besse, scheduled intermediate fuel assembly configurations within the core are not utilized. Intermediate positions would only be used when a fuel assembly does not fit into its designated location for the cycle due to exposure induced bowing, twisting, or other unforeseen inabilities to insert the fuel assembly in a normal manner. When this occurs, the fuel assembly may be set off to the side within the core until a more appropriate time for final positioning. In accordance with procedures, these changes to the scheduled fuel movement sheets must be made by a Reactor Engineer, and independently reviewed by a knowledgeable individual to ensure compliance with criticality restrictions on fuel placement.

Per Davis-Besse Technical Specification 3.9.1 the refueling boron concentration shall be based on the more conservative of the following reactivity conditions:

- a) Either a K_{eff} of 0.95 or less, which includes a 1 percent $\Delta k/k$ conservative allowance for uncertainties, or
- b) A boron concentration of ≥ 1800 ppm, which includes a 50 ppm conservative allowance for uncertainties.

The refueling boron concentration calculation for Davis-Besse assumes the final core configuration with no control rods installed. Normally during a fuel shuffle only one or two control rods are removed at any one time. Prior to new fuel receipt and subsequent movement, the fuel vendor performs a computer calculation to determine the refueling boron concentration. In addition, Toledo Edison performs its own calculations based on vendor supplied core physics data to confirm the fuel vendor's computer calculation.

The present Davis-Besse core design requires the new fuel assemblies, each containing a burnable poison rod assembly, to be set in a checkerboard pattern. Therefore, from a criticality standpoint, the worst possible single fuel assembly misloading would be placing a new fuel assembly in the core with a new fuel assembly on each adjacent side. As a part of the vendor supplied "Physics Operating Manual" calculations for the upcoming Cycle 7, the above worst case scenario was analyzed assuming zero B_4C concentration in the burnable poison rod assemblies. With the refueling boron concentration determined for the Cycle 7 core, the results of this analysis indicated a K_{eff} of less than 0.99 but greater than 0.95. The above misloading bounds all projected core configurations during refueling, from a criticality standpoint.

Based on the above results, procedure DB-PF-00100, Fuel Handling Administration, has been revised to state:

CAUTION

Do NOT place two or more new fuel assemblies side by side in the core, unless an analysis has been completed to ensure the boron concentration is sufficient to maintain $K_{eff} \leq 0.95$. (NRC Information Notice 89-51).

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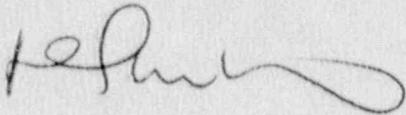
Prior to commencement of the upcoming core refueling (Sixth Refueling Outage) similar words will be added to DB-PF-06300, Fuel Load and Refueling Limits and Precautions.

In addition to the procedure modifications, training was conducted on NRC Bulletin Number 89-03 for those individuals responsible for refueling operations. This training was completed on February 9, 1990.

Based on the above actions taken by Toledo Edison and those actions to be completed prior to commencing the upcoming core refueling (Sixth Refueling Outage), Toledo Edison believes that the actions delineated in NRC Bulletin Number 89-03 have been adequately addressed and that the required minimum shutdown margin of 5 percent will be maintained during refueling operations.

Should you have any questions or require additional information, please contact Mr. R. W. Schrauder, Manager - Nuclear Licensing, at (419) 249-2366.

Very truly yours,



JSL/ssg

Enclosure

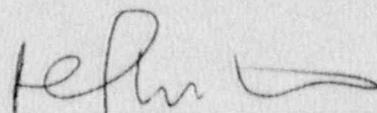
cc: P. M. Byron, DB-1 NRC Resident Inspector
A. B. Davis, Regional Administrator, NRC Region III
T. V. Wambach, DB-1 NRC Senior Project Manager

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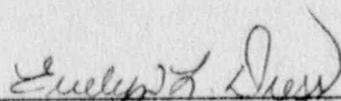
RESPONSE TO NRC BULLETIN 89-03
"POTENTIAL LOSS OF REQUIRED SHUTDOWN MARGIN DURING REFUELING OPERATIONS,"
FOR
DAVIS-BESSE NUCLEAR POWER STATION
UNIT NUMBER 1

This letter is submitted in conformance with Section 182a, Atomic Energy Act of 1954, as amended, and 10CFR50.54(f) in response to NRC Bulletin 89-03 "Potential Loss of Required Shutdown Margin During Refueling Operations."

By:


D. C. Shelton, Vice President Nuclear

Sworn and subscribed before me this 13th day of February, 1990.


Notary Public, State of Ohio

EVELYN L. DRESS
NOTARY PUBLIC, STATE OF OHIO
My Commission Expires July 28, 1994