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United States Nuclear Regulatory Commission
Chief, Rules Review and Directives Branch
Mail Stop T-6D-69
Washington, D. C. 20555-0001

Subject: Comments on Proposed NRC Bulletin 96-01, Supplement 1: Control Rod Insertion Problems

Ladies and Gentlemen:

Toledo Edison has reviewed the proposed generic communication, "Control Rod Insertion Problems," published in the May 20, 1997 Federal Register (62 FR 27629), as it applies to the Davis-Besse Nuclear Power Station (DBNPS). Enclosed for your consideration are our comments.

If you have any questions regarding this matter, please contact Mr. James L. Freels, Manager - Regulatory Affairs, at (419) 321-8466.

Very truly yours,

R. E. Donnellon

R. E. Donnellon
Director - DB Engineering & Services

MKL/laj

Enclosure

cc: A. B. Beach, Regional Administrator, NRC Region III
A. G. Hansen, DB-1 NRC/NRR Project Manager
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I&E

RESPONSE TO OPPORTUNITY FOR PUBLIC COMMENT
PROPOSED NRC BULLETIN 96-01 SUPPLEMENT 1
CONTROL ROD INSERTION PROBLEMS

General

The application of the actions requested by Supplement 1 to NRC Bulletin 96-01 to reactors designed by Babcock & Wilcox (B&W) and containing fuel assemblies manufactured by Framatome Cogema Fuels (FCF) represents an extrapolation of a very few limited events of very limited actual significance into a generic issue of safety significance. The data simply do not support or require such sweeping, imposing actions, particularly for B&W-designed plants.

Mark B Fuel Assembly Design

On December 18, 1996, FCF, along with the B&W Owner's Group, made a presentation to the NRC staff which discussed in detail the specific design features of the FCF Mark B fuel assembly that preclude control rod insertion problems. At the NRC's request, FCF provided a formal submittal on January 30, 1997, that summarized the issues discussed in the meeting of December 18.

As was stated in that meeting, the Mark B fuel assembly differs in a number of significant engineered design features from the Westinghouse Vantage 5H fuel design in which the problems were observed at Wolf Creek, North Anna, and South Texas Project. These design differences include:

- Larger outside diameter guide tubes, which are less susceptible to distortion or buckling caused by excessive axial loading of the fuel assembly.

- Uniform inside diameter guide tubes with no dashpot, which provide significantly more clearance for control rod insertion.

- Floating intermediate spacer grids which are not fixed to the guide tubes, which minimizes operating stresses due to differential growth between the fuel rods and the guide tubes.

- Top and bottom end spacer grids designed to permit loads on those grids to be transmitted directly to the upper and lower end fittings, respectively, instead of to the fuel rods or guide tubes.

- Keyed spacer grids, which permit stress free installation of the fuel rods during fabrication.

In addition to these engineered design features, FCF noted that a significant amount of measured performance data exists that demonstrates that the FCF fuel assembly is performing as expected with regard to fuel assembly growth, fuel assembly bow, guide tube corrosion, guide tube distortion, and control rod drag. Further, no instances have been reported of control rods failing to fully insert in a B&W-designed plant for reasons pertaining to inadequate fuel assembly design or unexpected fuel assembly behavior due to burnup.

Davis-Besse Nuclear Power Station Recent Experience

On May 4, 1997, the Davis-Besse Nuclear Power Station (DBNPS) experienced a reactor trip due to problems with the station's main transformer. At the time of this trip, twenty-three of the station's fifty-three control rods were located in fuel assemblies with burnups greater than the proposed limit of 35,000 MWd/mtU, including five control rods which resided in fuel assemblies whose burnups were in the range of 43,000-45,000 MWd/mtU. The core was approximately 11,100 MWd/mtU beyond beginning of cycle at the time of the trip. When the reactor tripped, all control rods fully inserted as designed.

Following this trip, the DBNPS performed control rod drop time testing to see if any anomalous behavior had been introduced to the system since the beginning of cycle. None of the control rods showed any degradation in drop time relative to the beginning of cycle. Further, no trend was observed between control rod drop time and fuel assembly burnup.

Design and Operating Differences

The proposed supplement to NRC Bulletin 96-01 does not address the fact that most, if not all, of the problems that have occurred in Westinghouse plants have been in plants with relatively high reactor exit moderator temperatures (greater than 615°F) and in fuel assemblies that have operated at relatively high fast flux levels. Westinghouse has shown that abnormal fuel assembly growth (i.e., Zircaloy guide tube growth) appears to be the root cause of this problem, and it has been demonstrated that Zircaloy can exhibit accelerated growth at high temperatures and in high fast fluxes. The DBNPS, on the other hand, has a reactor exit moderator temperature of less than 610°F, which is believed to be below the threshold where accelerated Zircaloy growth occurs. In addition, most of the high temperature plants operate at average power densities in the range of 105 to 110 kilowatts per litre, while the DBNPS has an average power density of only about 90 kilowatts per litre. Further, the DBNPS represents the maximum of the seven operating B&W-designed plants in both reactor exit moderator temperature and average power density, and the DBNPS's measured data indicate that no problems, nor even the precursor of any such problems, exist.

The combination of the fuel assembly design differences, fuel assembly performance data, and control rod performance data and drop times points to one conclusion: failure of control rods to fully insert on demand has not been, is not, and is not expected to be, a problem for B&W-designed plants fueled with FCF fuel assemblies.

The actions proposed in the draft supplement do not reflect the lack of actual safety significance this phenomenon has for B&W-designed plants, and, in some cases, the proposed alternatives may not be available for B&W-designed plants. For example, it is virtually impossible to design a reactor core for a twenty-four month fuel cycle, such as is being used today at the DBNPS and some other B&W-designed plants, and not have fuel assemblies that exceed 35,000 MWd/mtU at some time in life under control rods. This is particularly true when burnable poison rod assemblies (BPRAs) are used in fresh fuel assemblies to control power peaking and long term reactivity. Since BPRAs are inserted in the fuel assembly guide tubes, the use of such low burnup fuel assemblies in control rod locations is precluded. Therefore, limiting the burnup of fuel assemblies in control rod locations for B&W-designed plants would not be possible without imposing a significant financial burden on the owner utilities due to excessive fuel costs. Considering the data available, such financial burden is not warranted.

Safety Assessment

The proposed supplement's "Safety Assessment" does not address the potential increase in plant transients that would be caused by cycling the plant from hot full power to hot standby and back to hot full power every 2,500 MWd/mtU (about every 2.5 months for the DBNPS) for control rod drop time testing. Since such testing would be required for plants such as the DBNPS, a rigorous safety assessment by the NRC staff should be performed as part of the basis for issuance of this supplement.

The DBNPS Probabilistic Risk Assessment has demonstrated that the most likely initiators of a core melt accident are plant transients, and the likelihood of such transients increases when the plant is being cycled rather than being operated in a steady state, hot full power condition. Therefore, the requirement to shutdown and startup on a relatively frequent basis could, in fact, lead to a reduction in plant safety relative to operation at hot

full power conditions. This is particularly undesirable when the requirement to perform such plant cycling is imposed to address an issue for which it has already been adequately demonstrated that B&W-designed plants fueled with FCF fuel assemblies are not susceptible. Also, since there is no evidence or expectation of susceptibility in B&W-designed plants, the requirement to shutdown every 2.5 months produces considerable and unwarrated financial impact due to lost generation, replacement power costs, and waste water processing.

Current Licensing Basis

Although the proposed bulletin supplement makes reference to maintaining the current licensing basis with respect to ensuring that the control rods will satisfactorily perform their intended function, it does not address the effect of the proposed testing on the limited number of startup and shutdown transients contained in each plant's current licensing basis. The effect on plant systems, structures and components due to the proposed increase in the number of plant cooldown and heatup cycles resulting from increased control rod drop times testing should be rigorously analyzed by the NRC staff prior to proceeding further with this proposed bulletin supplement.

Environmental Impact

In addition, there would be an increase in the amount of radwaste generated due to the increased number of plant shutdowns and startups over a set period of time from that contemplated when the plant was initially licensed. This impact on the environment has not been addressed in the proposed generic communication which would be applicable to all operating Westinghouse and B&W-designed plants.

Backfit Analysis

The proposed bulletin supplement provides a "Backfit Discussion" which invokes the compliance exception of the 10 CFR 50.109 backfit rule. It states that the issuance of the

supplement is justified on the basis of the need to verify compliance with the current licensing basis with respect to shutdown margin and control rod drop times.

Toledo Edison disagrees with the invoking of the compliance exception because the NRC staff has not shown for the B&W-designed plants that the existing level of protection must be changed to provide adequate protection. The supplement's proposed action to perform control rod drop time testing constitutes a backfit due to the plant's existing current licensing basis as set forth in the Operating License Appendix A Technical Specifications (TS) on maintaining shutdown margin and frequency of control rod drop time testing. This proposed supplement would incur increased testing and represents a de facto license amendment or order.

The requested actions of the supplement constitute a backfit because by requesting an increased frequency for rod drop time testing, 10 CFR 50.109(a)(1) is applicable which states, in part:

> Backfitting is defined as the modification of or addition to . . . the procedures . . . required to operate a facility; . . . which result from the imposition of a regulatory position different from a previously applicable staff position.

NRC backfitting is authorized by 10 CFR 50.109 only when there is a "substantial increase" in the "overall protection" of the public health and safety or the common defense and security, and the direct and indirect costs of implementation for the facility are justified.

Therefore, the NRC staff must perform a backfit analysis pursuant to 10 CFR 50.109(c) which must address the costs associated with the backfit, the potential safety impact of

changes in the complexity of the operation of the plants, the potential impact of differences in facility types, etc.

Summary

As was stated previously, the presentation made to the NRC staff by FCF and the B&W Owner's Group on December 18, 1996, and the subsequent formal submittal by FCF on January 30, 1997, have demonstrated that this issue is not applicable to B&W-designed plants fueled with FCF fuel assemblies. This is true because of the numerous, significant, engineered design differences between the FCF Mark B fuel assembly and the Westinghouse Vantage 5H assembly in which the noted problems have occurred. In addition, FCF has presented sufficient performance data to show that these engineered design features function as expected in the field at all burnups. The recent control rod drop time testing performed at the DBNPS further supports this conclusion. Therefore, the NRC staff should review the information previously provided in the FCF submittal of January 30, 1997, and, following such review, remove the statements of applicability to Babcock & Wilcox reactors from the proposed Supplement to NRC Bulletin 96-01 before it is issued in its final form.