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VPNPD-88-459
NRC-88-085

September 7, 1988

Document Control Desk
U.S. NUCLEAR REGULATORY COMMISSION
Mail Station P1-137
Washington, D.C. 20555

Gentlemen:

DOCKET NO. 50-266 AND 50-301
SUPPLEMENT TO BULLETIN 80-04 RESPONSE
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

In our letter dated March 23, 1988, Wisconsin Electric identified an unanalyzed Main Steam Line Break (MSLB) scenario that could potentially be more severe than the analyses presented in the Point Beach Nuclear Plant FSAR. In this new scenario, feedwater addition to the faulted steam generator could continue for approximately two minutes, if the Main Feedwater regulating valve to that steam generator failed to shut. The March 23 letter identified two main concerns for the Main Steam Line Break accident. These concerns were the core Departure from Nucleate Boiling (DNB) response and the containment pressure response.

Core Response

The evaluation of the core response, as presented in the March 23 letter, is still valid. This evaluation concluded that DNB and subsequent core damage would not occur for this accident in the present cycles of operation for Point Beach Nuclear Plant, Units 1 and 2.

The NSSS vendor for PBNP Units 1 and 2, in their generic response to NRC IE Bulletin 80-04, stated that the first minute of the MSLB transient is dominated entirely by the steam flow contribution to primary-secondary heat transfer, which is the forcing function for both the reactivity and thermal-hydraulic transients in the core. It has been shown that negative reactivity inserted by concentrated boric acid from the high pressure safety injection system begins reducing core reactivity at approximately 50 seconds for the analysis of MSLB inside containment in the Point



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Beach FSAR. Therefore, the core response is very insensitive to feedwater flow. The conservative FSAR analysis shows a return-to-power situation due to an EOL shutdown margin assumption of 2.77% ΔK/K and a moderator density coefficient of 0.43 ΔK/K/gm/cc. These parameters are conservative compared to the expected characteristics of Point Beach fuel cycles. Therefore, the return-to-power situation should not be more severe than analyzed in the FSAR, even with the continued feedwater addition.

Containment Response

In an analysis performed by Westinghouse for the MSLB scenario being considered, the mass and energy release rates to containment were calculated. These release rates were used by Wisconsin Electric to estimate the containment peak pressure for this scenario. The estimated peak pressure was determined to occur at approximately six minutes after the break. Based on the calculated mass and energy release, the containment design pressure of 60 psig was estimated to be exceeded.

Subsequent evaluations of the analysis and its results, however, have shown that there are assumptions and approximations that may be leading to an unrealistically high mass-energy release. The following assumptions/approximations were evaluated:

1. The Westinghouse analysis assumes that the blowdown is single-phase steam with a quality of 1.0. This assumption could under-predict the mass velocity and over-predict the energy release rate. If the blowdown is actually two-phase, which is likely, some mass would go directly to the containment sump. This would leave less inventory of mass available to blowdown to containment as steam. Although Westinghouse did not have information regarding this phenomena for the Model 44 steam generators at PBNP, a review of Safety Analysis Reports for other facilities shows the use of a 15% reduction in the energy release based on two-phase blowdown arguments. This results in an approximately 15% reduction in the calculated peak containment pressure in those safety analyses that use entrainment to justify lower blowdown energy.

2. The entire feed line volume open to the steam generator was assumed to turn to steam and the heater drain tank pump suction inventory was assumed to be unlimited. It is likely that most of the feed water in the unisolable portion of the feed water system would not turn to steam or flow to the faulted steam generator. This would reduce the mass release by approximately 55,000 lbm. Also, the suction inventory of

the heater drain tank pumps would probably be limited in this event. The heater drain tank pump discharge flow control valve shuts on a low level signal for the heater drain tank. This could reduce the total mass release by approximately 45,000 lbm. Altogether approximately 100,000 lbm could be eliminated from blowdown in a more realistic analysis. These savings in mass inventory would substantially reduce the calculated peak containment pressure.

3. The mass and energy release analysis assumed blowdown to a constant 14.7 psia containment backpressure. In actuality, for a MSLB inside containment the blowdown and primary system cooldown would be limited by the pressurization of the containment building.

4. A return-to-power situation occurs in this analysis because an extremely conservative EOL moderator density coefficient and the worst-case shutdown margin are chosen. As previously explained these worst-case conditions do not exist in the current cycles of operation and normally would not exist for Point Beach fuel cycles. Therefore, less energy would be available to blow down to containment.

Justification for Continued Operation

Even in light of the above evaluations, the results of this analysis (performed by Westinghouse and Wisconsin Electric) show that the potential for containment overpressure does exist; therefore Wisconsin Electric has re-evaluated the consequences of this accident. It has been concluded that the radiological consequences of the MSLB inside containment would not be more severe than those presented in the PBNP FSAR for a MSLB outside containment. These consequences are based on Technical Specification limits for fuel failure, reactor coolant activity, and primary-to-secondary leakage. The conclusion in the PBNP FSAR, which states, "No significant exposure to the public would result from a rupture of a steam pipe", remains valid for this new MSLB scenario. Therefore, continued safe operation of Point Beach is assured until the long term corrective actions are implemented.

Long Term Corrective Actions

Wisconsin Electric is considering hardware modifications to PBNP that would eliminate this single-failure scenario from consideration as a credible accident for PBNP. The option currently being pursued will add an automatic closure feature to the existing heater drain tank pump discharge valves and trip open the condensate pumps' motor breakers. It is intended that these automatic actions will occur when a high containment pressure SI signal is generated, because this new single-failure scenario

is limited by the containment pressure acceptance criterion (failure of a train of safety injection is the currently assumed single-failure because the reactor core DNB ratio was the limiting criterion for the current FSAR analysis). The current feedwater isolation features for this accident are listed in the PBNP FSAR section 14.2.5 as, "any safety injection signal will rapidly close all feedwater control valves, trip the main feedwater pumps and close the feedwater pump discharge valves." The new features will enhance the existing features to provide the equivalent of redundant rapid feedwater isolation to eliminate this new scenario as a credible accident. Wisconsin Electric intends to proceed with detailed design of the proposed modifications. If the design effort does not reveal significant problems with this approach, Wisconsin Electric expects to implement the modifications in the Fall of 1989 for Unit 2 and Spring of 1990 for Unit 1. We will inform you if our proposed approach or implementation schedule is changed.

We would be pleased to answer any questions you have regarding the above information.

Very truly yours,

C. W. Fay
Vice President
Nuclear Power

Copies to NRC Regional Administrator, Region III
Resident Inspector