February 12, 1985

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Docket Nos. 50-266
and 50-301

Mr. C. W. Fay, Vice President
Nuclear Power Department
Wisconsin Electric Power Company
231 West Michigan Street, Room 308
Milwaukee, Wisconsin 53201

Dear Mr. Fay:

In conducting our review of your submittals dated June 30 and December 23, 1982 and May 17, 1984 relating to NUREG-0737 Item II.D.1, Performance Testing of Relief and Safety Valves, for the Point Beach Nuclear Plant, Units 1 and 2, we have determined that we will need additional information identified in the enclosure to continue our review.

In order for us to maintain our review schedule, your response is requested within 90 days of your receipt of this letter.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

Please contact us if you have questions concerning this request.

Sincerely,

Original signed by:

James R. Miller, Chief
Operating Reactors Branch #3
Division of Licensing

Enclosure:
Request for Additional
Information

cc w/enclosure
See next page

ORB#3:DL	ORB#3:DL	ORB#5:DL	ORB#3:DL
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REQUEST FOR ADDITIONAL INFORMATION

TMI ACTION NUREG-0737 (II.D.1)

FOR

POINT BEACH 1 AND 2

DOCKET NOS. 50-266 AND 50-301

JANUARY 1985

DRAFT

SAFETY EVALUATION QUESTIONS TMI ACTION NUREG-0737 II.D.1
FOR POINT BEACH UNITS 1 AND 2

Questions Related to Selection of Transients and Inlet Fluid Conditions

1. The Westinghouse valve inlet fluid conditions report stated that liquid discharge through both the safety and Power Operated Relief Valves (PORVs) is predicted for a FSAR feedline break event. The Westinghouse report gave expected peak pressure and pressurization rates for some plants having a FSAR feedline break analysis. The Point Beach Units 1 and 2 were not included in this list of plants having such a FSAR analysis. Nor does the Point Beach plant specific submittal address the FSAR feedline break event. NUREG-0737, however, requires analysis of accidents and occurrences referenced in Regulatory Guide 1.70, Revision 2, and one of the accidents so required is the feedline break. Provide a discussion on the feedwater line break event either justifying that it does not apply to this plant or identifying the fluid pressure and pressurization rate, fluid temperature, valve flow rate, and time duration for the event. Assure that the fluid conditions were enveloped in the EPRI tests and that the time period of water relief in the EPRI tests was as long as expected at the plant. Demonstrate operability of the safety valves and PORVs for this event and assure that the feedline break event was considered in analyses of the piping system.

2. In valve operability discussions the submittal does not identify fluid conditions for cold overpressurization transients. According to the Westinghouse valve inlet fluid conditions report, the PORVs are expected to operate over a range of steam, steam-water, and water conditions because of the potential presence of a steam bubble in the pressurizer. To assure that the PORVs operate for all cold overpressure events, discuss the range of fluid conditions for expected types of fluid discharge and identify data from EPRI tests that demonstrate operability

for these cases. Since no low pressure steam tests were performed for the relief valves, confirm that the high pressure steam tests demonstrate operability for the low pressure steam case for both opening and closing of the relief valves.

3. Results from the EPRI tests on the Crosby Safety valves indicate that the test blowdowns exceeded the design value of 5% for both "as installed " and "lowered" ring settings. The submittal states that increased blowdowns are not a safety concern since the Point Beach Nuclear Plant (PBNP) is designed to accommodate losses of reactor coolant resulting from openings in the reactor coolant system. The higher blowdowns may, however, cause a rise in pressurizer water level such that water may reach the safety valve inlet line and result in a steam-water flow situation. This flow condition would then have to be considered in valve operability evaluations. Discuss the possibility of water flow through the safety valves due to extended blowdowns.

Questions Related to Valve Operability

4. The submittal states that Wisconsin Electric would investigate whether the safety valve ring settings should be altered, but does not discuss results of this investigation. Identify the final ring settings selected for the Crosby 4K26 safety valves of Point Beach Units 1 and 2. Since EPRI tests on the Crosby 3K6 and 6M6 safety valves were used to assess performance of the 4K26 valves of Point Beach, identify which EPRI tests on the 3K6 and 6M6 valves had ring settings representative of those used on the plant 4K26 valve. Identify the expected blowdowns corresponding to the plant ring settings and explain how these blowdowns were extrapolated or calculated from test data. Verify that with the ring settings used the valves can perform their pressure relief function and the plant can be safely shutdown with the blowdown, backpressures, and fluid conditions occurring at the plant.

5. Results from EPRI tests on the Crosby 3K6 and 6M6 safety valves were used to evaluate performance of the Crosby 4K26 valve of Point Beach. The EPRI test results indicate that steam flow rates in excess of rated flow were achieved. A flow rate determination for the Point Beach valves, however, depends on the specific ring settings used at the plant. Thus, provide a demonstration that the plant safety valves will pass their rated flow at the ring settings used.

6. In two EPRI hot loop seal tests on the Crosby 6M6 safety valve, the valve chattered on closure and the tests were terminated after the valve was manually opened to stop chatter. The submittal states that these tests are not applicable to Point Beach since these tests were conducted at low backpressures while Point Beach has high backpressures (550 psig). Among the EPRI tests performed on the Crosby 3K6 and 6M6 valves, there was only one test performed with a hot loop seal (as is now used at PBNP) and high backpressure. This was a loop seal-steam-to-water transition test on the 3K6 valve, which resulted in valve chatter when the transition to water occurred. Explain how the results of cold loop seal tests with high backpressure can be used to show that the safety valves of PBNP can successfully discharge hot loop seal water followed by steam under high plant backpressures.

7. Bending moments are induced on the safety valves and PORVs during the time they are required to operate because of discharge loads and thermal expansion of the pressurizer tank and inlet piping. Make a comparison between the predicted plant moments with the moments applied to the tested valves to demonstrate that the operability of the valves will not be impaired.

8. As stated in Question 6, an EPRI loop seal steam-to-water transition test on the 3K6 safety valve resulted in valve chatter when the transition to water occurred. The 6M6 valve also chattered in a subcooled water test. These liquid flow tests may

be representative of a feedline break event (see Question 1). Justify that the valve behavior exhibited in these tests is not indicative of the performance expected for the Point Beach valves.

9. As a means of comparing inlet piping configurations of the plant safety valves and the test valves, a comparison between the two inlet piping pressure drops should be made. The submittal does state that the plant inlet piping is shorter than the test inlet piping, which should lead to a lesser plant-specific pressure drop. Provide a numerical comparison between a calculated plant pressure drop and the test pressure drop to verify that this is the case. Explain how the plant pressure drop was calculated.

10. To demonstrate operability of the block valves the submittal refers to the R. C. Youngdahl letter of June 1, 1982, which transmitted to the NRC the EPRI/Marshall Electric Motor Operated Valve Interim Test Data Report. In this block valve test program, the Limitorque SMB-000-5 motor operator that is used at PBNP was not tested. Since the SMB-000-5 operator is smaller than any tested, explain how the EPRI test results or other test data can be used to demonstrate operability of the motor operator.

11. NUREG-0737, Item II.D.1 requires that the plant-specific PORV control circuitry be qualified for design-basis transients and accidents. Please provide information which demonstrates that this requirement has been fulfilled.

Question related to Thermal Hydraulic Analysis

12. The submittal states that the rated flow capacity of the safety valve was the flow rate used in the thermal hydraulic analysis. For the safety valves, through, the ASME Code requires derating of the safety valves to 90% of actual flow capacity. The safety valve flows should thus be based on a flow of at least 111% of the valve flow rating, unless another flow rate can be justified. In view of the ASME derating requirement for

establishing safety valve flow rates, explain how fluid forces of sufficient magnitude were calculated when the actual flow rate could exceed that used in the analysis.

Questions Related to Structural Analysis

13. The submittal mentions high frequency pressure oscillations that occur in the piping upstream of the safety valve while loop seal water passes through the valve. The submittal states that the pressure pulses will not likely result in significant permanent strains in the inlet piping. In view of the fact that the pressure oscillations could excite high frequency vibration modes in the piping causing significant bending moments in the inlet piping, provide data or mathematical evidence to support this argument. The submittal also states that the oscillations may result in localized exceedance of code allowable stresses, but that this is not a problem since code allowables are based on quasi-statically applied pressure throughout the system rather than on localized pressure pulses. The stresses in the inlet piping should, however, be kept within justifiable stress limits. Therefore, establish an acceptable value for bending moments in the inlet piping and show that the acceptable bending moment is not exceeded during the pressure oscillations.

14. The submittal lists load combinations that were considered in the piping analysis. The load combinations listed do not include an upset condition in which an operating basis earthquake is combined with a PORV discharge transient. This is a recommended load case in the EPRI Guide for Application of Valve Test Program Results to Plant-Specific Evaluations for the piping upstream of the valves and the seismically designed downstream portion. Provide justification for not considering this load combination in the analysis.

15. A program called SUPERPIPE was used to perform the structural analysis. In this program the response to fluid transient

loading is calculated using the direct integration method. The submittal states that SUPERPIPE has been extensively benchmarked against several other piping analysis programs and has been proven to be both accurate and cost effective. Explain whether the benchmarking has included fluid transient problems similar to that of the pressure/relief valve system where the direct integration solution method was exercised and provide evidence that the program generated an accurate solution.

16. Results of the analysis reported in the December 23, 1982 submittal indicated that there were numerous exceedances of stress allowables in both the upstream and downstream portions of the safety valve and PORV piping sections. According to the May 17, 1984 submittal several supports were added to the Unit 1 and 2 piping systems while others were modified or removed. Explain whether a final analysis was performed to show that the modified piping system meets code allowables. Provide a copy of the SUPERPIPE structural models for Units 1 and 2.

17. The submittal presents a loop seal temperature profile that was used in the thermal hydraulic analysis. Since the fluid forces acting on the system can be significantly affected by the loop seal temperatures, explain how this profile was derived and provide verification of its accuracy.