June 25, 1998

30-266/301

Mr. Michael B. Sellman Chief Nuclear Officer Wisconsin Electric Power Company 231 West Michigan Street Milwaukee, WI 53201

SUBJECT: POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION RE: RESPONSES TO GENERIC LETTER 96-06 (TAC NOS. M96852 AND M96853)

Dear Mr. Sellman:

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity

During Design-Basis Accident Conditions," dated September 30, 1996, included a request

for licensees to evaluate cooling water systems that serve containment air coolers to assure

that they are not vulnerable to waterhammer and two-phase flow conditions. Wisconsin

Electric (WE) Power Company provided its assessment of the waterhammer and two-phase

flow issues for the Point Beach units in letters dated January 28, June 25, and

December 18, 1997, and related submittals dated September 9, September 30, and

October 30, 1996. To complete our review of WE's resolution of these issues, additional

information is required. Please provide WE's response to the enclosed request for additional

information by August 30, 1998, in order to support our review schedule for GL 96-06.

Sincerely,

ORIGINAL SIGNED BY

Linda L. Gundrum, Project Manager Project Directorate III-1 Division of Reactor Projects - III/IV Office of Nuclear Reactor Regulation

Enclosure: RAI

cc w/encl: See next page

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Mr. Michael B. Sellman Wisconsin Electric Power Company

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Ms. Sarah Jenkins Electric Division Public Service Commission of Wisconsin P.O. Box 7854 Madison, Wisconsin 53707-7854 Point Beach Nuclear Plant Units 1 and 2

March 1998

REQUEST FOR ADDITIONAL INFORMATION FOR RESOLUTION OF GL 96-06 ISSUES AT POINT BEACH UNIT NOS. 1 AND 2 (TAC NOS. M96852 AND M96853)

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996, included a request for licensees to evaluate cooling water systems that serve containment air coolers to assure that they are not vulnerable to waterhammer and two-phase flow conditions. Wisconsin Electric Power Company (the licensee) provided its assessment of the waterhammer and twophase flow issues for the Point Beach units in letters dated January 28, June 25, and December 18, 1997, and related submittals dated September 9, September 30, and October 30, 1996. The licensee has determined that the waterhammer and two-phase flow issues discussed in GL 96-06 are valid concerns fcr the Point Beach units and extensive analyses have been completed to address these issues. However, in order to fully assess the licensee's resolution of these issues, the following additional information is requested:

- Note: Information that has been submitted previously may be referred to and supplemented as necessary to provide a complete response to the staff's questions.
- If a methodology other than that discussed in NUREG/CR-5220, "Diagnosis of Condensation-Induced Waterhammer," was used in evaluating the effects of waterhammer, describe this alternate methodology in detail. Also, explain why this methodology is applicable and gives conservative results (typically accomplished through rigorous plantspecific modeling, testing, and analysis).
- 2. For both the waterhammer and two-phase flow analyses, provide the following information:
 - a. Identify any computer codes that were used in the waterhammer and two-phase flow analyses and describe the methods used to bench mark the codes for the specific loading conditions involved (see Standard Review Plan Section 3.9.1).
 - b. Describe and justify all assumptions and input parameters (including those used in any computer codes) such as amplifications due to fluid-structure interaction, cushioning, speed of sound, force reductions, and mesh sizes, and explain why the values selected give conservative results. Also, provide justification for omitting any effects that may be relevant to the analysis (e.g., fluid structure interaction, flow induced vibration, erosion).
 - c. Provide a detailed description of the "worst case" scenarios for waterhammer and twophase flow, taking into consideration the complete range of event possibilities, system configurations, and parameters. For example, all waterhammer types and water slug scenarios should be considered, as well as temperatures, pressures, flow rates, load

combinations, and potential component failures. Additional considerations for twophase flow include:

- · the effects of void fraction on flow balance and heat transfer;
- the consequences of steam formation, transport, and accumulation;
- cavitation, resonance, and fatigue effects; and
- erosion considerations.

Licensees may find NUREG/CR-6031, "Cavitation Guide for Control Valves," helpful in addressing some aspects of the two-phase flow analyses. (Note: it is important for licensees to realize that in addition to heat transfer considerations, two-phase flow also involves structural and system intr grity concerns that must be addressed).

- d. Confirm that the analyses included a complete failure modes and effects analysis (FMEA) for all components (including electrical and pneumatic failures) that could impact performance of the cooling water system and confirm that the FMEA is documented and available for review, or explain why a complete and fully documented FMEA was not performed.
- e. Explain and justify all uses of "engineering judgement."
- Determine the uncertainty in the waterhammer and two-phase flow analyses, explain how the uncertainty was determined, and how it was accounted for in the analyses to assure conservative results.
- 4. Confirm that the waterhammer and two-phase flow loading conditions do not exceed any design specifications or recommended service conditions for the piping system and components, including those stated by equipment vendors; and confirm that the system will continue to perform its design-basis functions as assumed in the safety analysis report for the facility and that the containment isolation valves will remain operable.
- Provide a simplified diagram of the system, showing major components, active components, relative elevations, lengths of piping runs, and the location of any orifices and flow restrictions.
- Describe in detail any plant modifications or procedure changes that have been made or are planned to be made to rescive the waterhammer and two-phase flow issues.