

November 20, 2000

Mr. Mark Reddemann  
Site Vice President  
Kewaunee and Point Beach Nuclear Power Plants  
Nuclear Management Company, LLC  
6610 Nuclear Road  
Two Rivers, WI 54241

SUBJECT: KEWAUNEE NUCLEAR POWER PLANT - COMPLETION OF FOLLOW-UP  
TO CONTAINMENT ANALYSIS METHODOLOGY - ENTRAINMENT  
ASSUMPTIONS IN UPDATED FINAL SAFETY ANALYSIS REPORT  
(TAC NO. MA1541)

Dear Mr. Reddemann:

On April 15, 1998, the U.S. Nuclear Regulatory Commission (NRC) issued a letter, "Bases Change to Technical Specifications for Facility Operating License DPR-43 - Kewaunee Nuclear Power Plant (TAC No. M98638)." In the April 15, 1998, letter, the staff identified concerns relating to the Kewaunee main steamline break (MSLB) entrainment assumption.

Entrainment refers to the moisture carryover or quality of the steam/water mixture effluent from a line break. High steam flow rates may result in the inability of steam generator (SG) moisture separators to remove entrained liquid from the steam flow. This results in a much more rapid blowdown and dryout of the faulted SG, which in turn results in a reduction in the heat energy to containment contributed by primary to secondary heat transfer in the faulted SG. Due to the entrainment effect, the "worst case" MSLB for containment peak pressure is typically a break of a size just small enough to preclude significant entrainment.

As described in the original Final Safety Analysis Report (FSAR), the original MSLB containment pressure-temperature (P-T) analysis assumed a 100 percent quality steam flow, but the flow rate was arbitrarily reduced to 85 percent to account for entrainment. The conservatism of the 0.85 factor was validated using the "Armand Correlation" (FSAR pages dated May 15, 1973).

In the letter dated April 15, 1998, it was noted that Kewaunee's MSLB containment P-T analysis did not arbitrarily reduce the steam flow, but it utilized an entrainment model. The entrainment model used in Kewaunee's DYNODE mass and energy release calculation was based on RETRAN SG modeling. The staff noted that Kewaunee's entrainment modeling for the MSLB containment P-T analysis was non-conservative.

Prairie Island is a two-loop Westinghouse Pressurized Water Reactor similar to the Kewaunee design. On September 29, 1999, the staff issued a letter to Prairie Island titled, "Proposed Main Steamline Break Methodology (TAC Nos. M99108 and M99109)." The staff determined that the proposed entrainment model is applicable to the Prairie Island design. Prairie Island used DYNODE code to calculate mass and energy release from the break, then the DYNODE results were used as input to the CONTEMPT code for containment response evaluation. Kewaunee

uses DYNODE and CONTEMPT codes. Since the staff determined that the proposed entrainment model is applicable to the Prairie Island design and Prairie Island and Kewaunee have similar designs and MSLB methodology, the use of the Kewaunee MSLB entrainment assumption is not considered a significant safety concern.

Recently, Nuclear Management, LLC submitted a proposed license amendment titled, "Wisconsin Public Service Corporation Reload Safety Evaluation Methods Topical Report, WPSRSEM-NP, Revision 3," dated October 12, 2000. This submittal includes the following codes: DYNODE-P, RETRAN-3D, CONTEMPT LT-28, and GOTHIC. The DYNODE-P and/or RETRAN-3D programs are used to analyze the transient response to the nuclear steam supply system. CONTEMPT LT-28 and GOTHIC are used to analyze the containment thermal-hydraulic response to loss-of-coolant and MSLB accidents. Mass and energy data are provided to CONTEMPT LT-28 and GOTHIC from DYNODE-P or RETRAN-3D for the MSLB. The staff is currently reviewing the Kewaunee Reload Safety Evaluation Methods Topical Report, WPSRSEM-NP, Revision 3 submittal dated October 12, 2000. This review will encompass the concerns raised in the letter dated April 15, 1998. Therefore, the staff is closing out TAC No. MA1541.

If you have any questions regarding this matter, please contact me at (301) 415-1446.

Sincerely,

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John G. Lamb, Project Manager, Section 1  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-305

cc: See next page



Kewaunee Nuclear Power Plant

cc:

Foley & Lardner  
ATTN: Bradley D. Jackson  
One South Pinckney Street  
P.O. Box 1497  
Madison, WI 53701-1497

Nuclear Asset Manager  
Wisconsin Public Service Corporation  
600 N. Adams Street  
Green Bay, WI 54307-9002

Chairman  
Town of Carlton  
Route 1  
Kewaunee, WI 54216

Plant Manager  
Kewaunee Nuclear Power Plant  
Nuclear Management Company, LLC  
North 490, Highway 42  
Kewaunee, WI 54216-9511

Harold Reckelberg, Chairman  
Kewaunee County Board  
Kewaunee County Courthouse  
Kewaunee, WI 54216

Attorney General  
114 East, State Capitol  
Madison, WI 53702

U.S. Nuclear Regulatory Commission  
Resident Inspectors Office  
Route #1, Box 999  
Kewaunee, WI 54216

Regional Administrator - Region III  
U.S. Nuclear Regulatory Commission  
801 Warrenville Road  
Lisle, IL 60532-4531

James D. Loock, Chief Engineer  
Public Service Commission  
of Wisconsin  
610 N. Whitney Way  
Madison, WI 53707-7854

Michael D. Wadley  
Chief Nuclear Officer  
Nuclear Management Company, LLC  
700 First Street  
Hudson, WI 54016