



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

March 23, 2001

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 - REQUEST FOR ADDITIONAL  
INFORMATION RELATED TO RELOAD SAFETY EVALUATION METHODS  
TOPICAL REPORT, WPSRSEM-NP, REVISION 3 (TAC NO. MB0306)

Dear Mr. Reddemann:

By letter dated October 12, 2000, Nuclear Management Company, LLC (NMC or the licensee) forwarded a topical report WPSRSEM-NP, Revision 3, entitled, "Reload Safety Evaluation Methods for Application to Kewaunee" and requested Nuclear Regulatory Commission (NRC) staff review and approval. Also, the topical report is intended to be applicable to Kewaunee reload cycles after and including Cycle 25, presently scheduled to commence in the fall of 2001.

The topical report reflects the following:

- Editorial changes, including corrections to the limiting directions of core physics parameters and clarification of the definition of core physics parameters.
- Changes made to incorporate the CONTEMPT code for containment analysis. CONTEMPT is currently described for this purpose in the Kewaunee updated safety analysis report (USAR).
- The adoption of the GOTHIC code for containment analysis.
- Changes in Reload Safety Evaluation Methods due to Large Break Loss-of-Coolant Accident Upper Plenum Injection Analysis.
- The adoption of RETRAN-3D for use in the 2D mode for system analysis.
- The extension of the VIPRE-01 code to reflect changes in fuel design.

The NRC staff finds that the additional information identified in Enclosure 1 is needed. Enclosure 1 revises the questions sent in a letter dated March 16, 2001, to request additional information regarding entrainment.

A draft of the request for additional information (RAI) (Enclosure 2) was e-mailed to Mr. G. Riste (NMC) and discussed by telephone call on March 21, 2001. The telephone call was held between the NRC staff and the NMC staff to discuss the questions to ensure that there was no misunderstanding.

A mutually agreeable response date is 21 days from the date of this letter. This RAI letter supersedes the RAI letter dated March 16, 2001.

M. Reddemann

- 2 -

Please contact me at (301) 415-1446 if future circumstances should require a change in this response date.

Sincerely,

/RA/

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

Docket No. 50-305

- Enclosures: 1. Request for Additional Information
- 2. E-mail with Draft Request for Additional Information

cc w/encls: See next page

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M. Reddemann

- 2 -

Please contact me at (301) 415-1446 if future circumstances should require a change in this response date.

Sincerely,

A handwritten signature in black ink, appearing to read "John G. Lamb". The signature is written in a cursive style with a large initial "J" and "L".

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

Docket No. 50-305

Enclosures: 1. Request for Additional Information  
2. E-mail with Draft Request for Additional Information

cc w/encls: See next page

Kewaunee Nuclear Power Plant

cc:

Foley & Lardner  
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Madison, WI 53701-1497

Nuclear Asset Manager  
Wisconsin Public Service Corporation  
600 N. Adams Street  
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Chairman  
Town of Carlton  
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Kewaunee, WI 54216

Plant Manager  
Kewaunee Nuclear Power Plant  
Nuclear Management Company, LLC  
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Gerald Novickus, Chairman  
Kewaunee County Board  
Kewaunee County Courthouse  
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Attorney General  
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Resident Inspectors Office  
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Michael D. Wadley  
Chief Nuclear Officer  
Nuclear Management Company, LLC  
700 First Street  
Hudson, WI 54016

**REQUEST FOR ADDITIONAL INFORMATION REGARDING**  
**KEWAUNEE RELOAD SAFETY EVALUATION METHODS TOPICAL REPORT,**  
**WPSRSEM-NP, REVISION 3 (TAC NO. MB0306)**

The Nuclear Regulatory Commission (NRC) staff finds that the following additional information is needed:

1. Please provide one copy of Reference A12, WCAP-15427, "Development and Qualification of a GOTHIC Containment Evaluation Model for the Kewaunee Nuclear Power Plant," R. Ofstun, July 2000
2. To the extent that the above report does not contain this information, provide for the GOTHIC model:
  - 2.1 Details of how the Kewaunee containment will be modeled for a LOCA and a main steam line break
  - 2.2 Assumptions used for licensing basis calculations including containment initial conditions of temperature, pressure and humidity; heat transfer correlations; modeling of the velocity of the containment atmosphere and its effect on heat transfer; timing of ESF equipment; assumptions of spray behavior (droplet size distribution, spray effectiveness); interactions of containment atmosphere with the sump following a LOCA; modeling of RHR heat exchanger; modeling of fan coolers; modeling of containment structures; any other modeling assumptions which have a significant effect on the calculated pressure and temperature of the containment.
  - 2.3 Describe or provide a reference on how calculations of the mass and energy release (including entrainment) to the containment are performed. In addition, please provide the following:
    - 2.3.1 A comparison of RETRAN -3D steam generator model with experimental data,
    - 2.3.2 A drawing showing the RETRAN 3-D steam generator noding used for the experiment(s) and the Kewaunee steam generator,
    - 2.3.3 A list of assumptions used in the modeling of the mass and energy release from the Kewaunee steam generator during a main steam line break,
    - 2.3.4 A description of any factor added to the quality of the steam generator blowdown to account for uncertainty in the mass and energy release calculation, and

ENCLOSURE 1

- 2.3.5 A discussion of why a comparison using RETRAN-3D with data from an experimental facility which differs in scale and configuration from the Kewaunee steam generator provides confidence in the ability of RETRAN-3D to predict Kewaunee steam generator blowdown behavior following a main steam line break. (For instance: Are all the phenomena one would expect in the Kewaunee steam generator blowdown also included in the experiment? Would differences in the geometry between the experiment and the Kewaunee steam generator affect the confidence in RETRAN-3D to predict the behavior of the Kewaunee steam generator blowdown if there were good agreement between RETRAN-3D and the experiment?)
- 2.4 List and describe the conservatisms in the above modeling.
- 2.5 List any other licensing basis uses of the GOTHIC code beside LOCA and main steam line break analyses.
3. Does the Kewaunee use of GOTHIC comply with the guidance of GL 83-11, "Licensee Qualification for Performing Safety Analyses in Support of Licensing Actions," [February 8, 1983] and GL 83-11 Supplement 1, "Licensee Qualification for Performing Safety Analyses?" [June 24, 1999]

**From:** John Lamb  
**To:** internet: GRISTE@wpsr.com  
**Date:** 3/21/01 4:02PM  
**Subject:** Fwd: Revised questions on Kewaunee Reload Methods

Gerry,

Attached are the draft RAI questions we discussed in our conference call. I will send a formal RAI letter as soon as possible.

John

**From:** Richard Lobel  
**To:** John Lamb  
**Date:** 3/21/01 3:52PM  
**Subject:** Revised questions on Kewaunee Reload Methods

**CC:** Summer Sun

REQUEST FOR ADDITIONAL INFORMATION  
WISCONSIN PUBLIC SERVICE CORPORATION RELOAD SAFETY EVALUATION  
METHODS TOPICAL REPORT  
WPSRSEM-NP, Revision 3

1. Please provide one copy of Reference A12, WCAP-15427, "Development and Qualification of a GOTHIC Containment Evaluation Model for the Kewaunee Nuclear Power Plant," R. Ofstun, July 2000

2. To the extent that the above report does not contain this information, provide for the GOTHIC model:

2.1 Details of how the Kewaunee containment will be modeled for a LOCA and a main steam line break

2.2 Assumptions used for licensing basis calculations including containment initial conditions of temperature, pressure and humidity; heat transfer correlations; modeling of the velocity of the containment atmosphere and its effect on heat transfer; timing of ESF equipment; assumptions of spray behavior (droplet size distribution, spray effectiveness); interactions of containment atmosphere with the sump following a LOCA; modeling of RHR heat exchanger; modeling of fan coolers; modeling of containment structures; any other modeling assumptions which have a significant effect on the calculated pressure and temperature of the containment.

2.3 Describe or provide a reference on how calculations of the mass and energy release (including entrainment) to the containment are performed. In addition, please provide the following:

2.3.1 A comparison of RETRAN -3D steam generator model with experimental data

2.3.2 A drawing showing the RETRAN 3-D steam generator noding used for the experiment(s) and the Kewaunee steam generator

2.3.3 A list of assumptions used in the modeling of the mass and energy release from the Kewaunee steam generator during a main steam line break

2.3.4 A description of any factor added to the quality of the steam generator blowdown to account for uncertainty in the mass and energy release calculation

2.3.5 A discussion of why a comparison using RETRAN-3D with data from an experimental facility which differs in scale and configuration from the Kewaunee steam generator provides confidence in the ability of

RETRAN-3D to predict Kewaunee steam generator blowdown behavior following a main steam line break. (For instance: Are all the phenomena one would expect in the Kewaunee steam generator blowdown also included in the experiment? Would differences in the geometry between the experiment and the Kewaunee steam generator affect the confidence in RETRAN-3D to predict the behavior of the Kewaunee steam generator blowdown if there were good agreement between RETRAN-3D and the experiment.

2.4 List and describe the conservatisms in the above modeling

2.5 List any other licensing basis uses of the GOTHIC code beside LOCA and main steam line break analyses.

3. Does the Kewaunee use of GOTHIC comply with the guidance of GL 83-11, "Licensee Qualification for Performing safety Analyses in Support of Licensing Actions," [February 8, 1983] and GL 83-11 Supplement 1, "Licensee Qualification for Performing Safety Analyses?" [June 24, 1999]