July 3, 2002

Mr. Mark Warner
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 PROPOSED REVISION TO THE KEWAUNEE NUCLEAR POWER PLANT DESIGN-BASIS RADIOLOGICAL ANALYSIS ACCIDENT SOURCE TERM (TAC NO. MB4596)

Dear Mr. Warner :

By letter dated March 19, 2002, Nuclear Management Company, LLC (NMC or the licensee) submitted a request for a proposed revision to the Kewaunee Nuclear Power Plant accident source term used for design-basis radiological analyses.

The Nuclear Regulatory Commission (NRC) staff finds that the additional information identified in the enclosure is needed.

A draft of the request for additional information was e-mailed to Mr. G. Riste (NMC) on May 21, 2002.

A phone call was held between G. Riste (NMC), J. Holly (NMC), B. McCain (NMC), B. Heida (NMC), J. Lee (NRC), and myself on June 27, 2002, to discuss the questions to ensure that there was no misunderstanding. Also, the phone call established a mutually agreeable response date of 45 days from the date of this letter.

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

Enclosure: Request for Additional Information

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION REGARDING

REQUEST FOR PROPOSED REVISION TO KEWAUNEEE NUCLEAR POWER PLANT

DESIGN-BASIS RADIOLOGICAL ANALYSIS ACCIDENT SOURCE TERM

(TAC NO. MB4596)

The staff considers the implementation of an alternative source term (AST) at Kewaunee nuclear power plant to be a significant change to the Kewaunee design-basis. You have voluntary initiated to implement an AST. The staff may find that new or unreviewed issues are created by implementation of the AST, warranting re-review of technical positions previously accepted and approved by the staff.

In order to complete our review and evaluation of the subject license amendment request, the U.S. Nuclear Regulatory Commission staff requests the following additional information:

1. Provide the radiological dose calculations performed for determining the radiological doses at the exclusion area boundary (EAB), low population zone (LPZ), and in the control room for all design-basis accidents evaluated. If computer code programs were used for the dose calculations, provide copies of the inputs prepared and outputs obtained from the computer code system. If spread sheets were used, provide copies of its calculation sheets.

2. In a letter to NRC dated February 28, 1989 (NRC-89-23), you stated that you performed an extensive system performance testing on the control room ventilation system to quantify unfiltered air inleakage to the control room. You further stated that the test estimated approximately 200 cfm of unfiltered inleakage into the control room emergency zone through identifiable pathways. Since 1989, the staff has been working toward resolution of generic issues related to control room habitability, with a particular focus on the validity of the control room unfiltered air inleakage rates that are commonly assumed in licensee’s analyses of the control room habitability. The staff recently issued proposed generic communication (letter) on control room envelope habitability in Federal Register (May 9, 2002) for public comment (ADAMS Accession No. ML021090031). The staff also recently issued two draft regulatory guides: DG-1114, “Control Room Habitability at Light-Water Nuclear Power Reactors (ADAMS Accession No. ML020790125) and DG-1115, “Demonstrating Control Room Envelope Integrity at Light-Water Nuclear Power Reactors (ADAMS Accession No. ML020790191), for public comment.

   Summarize the performance test results obtained in 1989 and state in detail how you estimated unfiltered air inleakage (200 cfm) using the system performance test results. Provide any additional substantiated bases subsequent to the test performed in 1989 that support 200 cfm unfiltered air inleakage rate you assumed. You should include, as appropriate, results from any subsequent inleakage and/or system flow tests performed, maintenance performed on the system to minimize the inleakage, and any modification/upgrade done to the system to improve the system integrity.

ENCLOSURE

3. Provide a figure showing the reactor containment vessel, shield building, auxiliary building, control room, control room normal and emergency air intakes, refueling water storage tank and all source term release points.

4. In Section 2.2.2, “Containment Modeling” of Attachment 2 to your submittal (Attachment 2), you assumed that:

- during the first 10 minutes of the accident, 90 percent of activity leaking from the containment is discharged directly to the environment and 10 percent enters the auxiliary building,

- after 10 minutes, only 1 percent of the activity leaking from the containment is discharged directly to the environment, 10 percent continues to go to the auxiliary building, and the remaining 89 percent will go to the shield building, and

- once the shield building is brought to subatmospheric pressure at 30 minutes into the event, the iodine is subject to removal by recirculation through filters. In addition, you assumed various shield building air flow rates in Table 12 of Attachment 2.

Provide substantiated technical bases for these timing, release fractions, and air flow rates assumed stating why some of these parameters are different from those listed as the design bases for the radiological analyses in Section 14.3.5 of the Kewaunee updated safety analysis report (USAR) and in Attachment 3, “Updated Control Room Habitability Evaluation Report,” to your letter dated February 28, 1989 (UCRHER).

5. Table 12 of Attachment 2 lists containment vessel volume as 1.32E6 ft^3. State the sprayed and unsprayed volumes of the containment vessel.

6. Table 14.3-8 of the USAR and the UCRHER lists the fission product removal coefficients for elemental and particulate iodine for the containment vessel internal spray system as 10.0 and 0.45 per hour respectively. Contrary to these values, you proposed in this license amendment to use iodine removal coefficients of 20 and 5 per hour for iodine in elemental and particulate forms respectively. Explain the discrepancies in detail.

7. State the basis for 0.91 hour switch-over time to recirculation spray from the start of the accident.

8. Tables 12 through 18 lists the major parameters used in the radiological consequence analyses for the design-basis accidents. List the reactor power level and the duration of accident assumed for each design-basis accident. You stated in Section 1.2 of Attachment 2 that the fission product activities in Table 5 are increased by an additional 10 percent to cover future power uprate.

9. In Section 1.2 of Attachment 2, you stated that control room operator doses were determined for duration of the event. The staff requests you recalculate control room operator doses for 30 days for all design-basis accidents as illustrated in your Reference No. 11 of Attachment 2 independent of the fission product release duration. The

airborne fission products intruded into the control room atmosphere may remain well after the fission product releases are terminated.

10. In Section 2.2.4 of Attachment 2, you assumed that the emergency core cooling system (ECCS) leakage to the auxiliary building and the residual heat removal back-leakage to the refueling water storage tank (RWST) are 6 gph and 3 gpm, respectively. State substantiated bases for these assumptions and where these limits are specified in the design-basis documents or in the plant operating procedures. State how you modeled the fission product transport and release through the RWST to the environment.

11. In Section 2.2.4 of Attachment 2, you also assumed that the iodine partition factor is reduced to 1 percent once the auxiliary building sump water temperature is below 212 °F. Provide the technical bases to justify the lower iodine partition factor assumed.

12. In Section 2.2.4 of Attachment 2, you also assumed that half of the iodine activity that becomes airborne from two leak sources in the auxiliary building is removed by plateout on surfaces. Justify your assumption.

13. Table 1 of Attachment 2 shows the radiological consequences of the postulated design-basis accidents. List dose contributions from each fission product release pathway (containment leak, ECCS leak, and RWST back-leakage release) to the loss-of-coolant accident doses (EAB, LPZ and control room).

14. List the control room atmospheric relative concentrations (χ/Q values) used in your control room operator dose calculations for each fission product release point. The χ/Q values shown in Table 4 bound all release points?

15. In determining the radiological consequences resulting from the design-basis steam generator tube rupture (SGTR) accident, provide the following information:

    - letdown flow rate
    - primary coolant mass
    - iodine appearance rates for each iodine nuclide
    - average iodine concentrations over 0 to 2 hours and 0 to 4 hours
    - amounts of iodine and noble gas released over 0 to 2 hours and 0 to 4 hours

16. Show that the iodine gap activity would be depleted within 4.0 hours terminating iodine spike at that time for the postulated SGTR accident.

17. Table 13 of Attachment 2 lists the bounding SGTR thermal hydraulic parameters for the radiological consequence analysis. Provide the references for the following parameters used:

    - tube rupture break flow
    - tube rupture break flow flashing fractions
    - amounts of steam released to the environment from the ruptured and intact SGs
    - termination of steam release from the intact SGs at 8 hours after the accident
    - termination of steam release at 30 minutes from the faulted SG

- termination of steam release at 72 hours from the faulted SG after the main steamline break accident

18. List the control room isolation times for each design-basis accident in a separate table with its bases and its initiating signals. State if you included the switchover time to the ventilation system after safety initiation signal.

19. Table 16 of Attachment 2 lists assumptions used for rod ejection dose analysis. Provide technical bases and/or references for the following parameters:

    - fraction of fuel melting
    - steam releases to the environment

20. Table 17 of Attachment 2 lists assumptions used for fuel handling accident dose analysis. Provide technical bases for chemical forms assumed in release to the environment as 70 percent in elemental form and 30 percent in organic form.

21. Table 19 of Attachment 2 lists the fission product source terms used for the gas decay tank and the volume control tank rupture dose analyses. Explain in detail why these source terms are differ from those listed in Tables D.6-1 and D.7-1 in Appendix D to Chapter 14 of the Kewaunee USAR (See pages 14.2-8 through 14.2-10). What are the bases for 5 minute release time while the Kewaunee USAR correctly assumed it to be an instantaneous release (see Section 14.2.3 of the Kewaunee USAR).

cc:

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