June 22, 2006

Mr. Paul A. Harden
Site Vice President
Nuclear Management Company, LLC
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES PLANT — REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE LICENSE AMENDMENT REQUEST TO REMOVE TRI-SODIUM PHOSPHATE FROM THE PALISADES CONTAINMENT (TAC NO. MD0537)

Dear Mr. Harden:

Your letter of March 20, 2006, requested a license amendment to remove tri-sodium phosphate from the Palisades' containment. We are reviewing your request, and find that we need additional information as shown in the enclosed request for additional information (RAI). I discussed this RAI with Ms. Amy Hazelhoff of your organization on June 9, 2006, and she agreed to respond by July 8, 2006. Please contact me at (301) 415-1423 if you have questions.

Sincerely,

/RA/

L. Mark Padovan, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure:
RAI

cc w/encl: See next page

June 22, 2006

Mr. Paul A. Harden
Site Vice President
Nuclear Management Company, LLC
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES PLANT — REQUEST FOR ADDITIONAL INFORMATION RELATED TO THE LICENSE AMENDMENT REQUEST TO REMOVE TRI-SODIUM PHOSPHATE FROM THE PALISADES CONTAINMENT (TAC NO. MD0537)

Dear Mr. Harden:

Your letter of March 20, 2006, requested a license amendment to remove tri-sodium phosphate from the Palisades' containment. We are reviewing your request, and find that we need additional information as shown in the enclosed request for additional information (RAI). I discussed this RAI with Ms. Amy Hazelhoff of your organization on June 9, 2006, and she agreed to respond by July 8, 2006. Please contact me at (301) 415-1423 if you have questions.

Sincerely,

/RA/
L. Mark Padovan, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure:
RAI

cc w/encl: See next page

DISTRIBUTION:

PUBLIC	RidsNrrPMMPadovan	RidsNrrLATHarris	RidsNrrDorlLpl3-1
RidsNrrDorlDpr	RidsOgsRp	RidsAcrsAcnwMailCenter	CLipa, Rgn-III
MHart	LBrown	LPL3-1 R/F	YDiaz-Castillo
RArchitzel	RTorres	PKlein	MYoder
TKoshy	MKotzalas	MScott	TBloomer

ADAMS Accession Number: **ML061210067**

OFFICE	NRR/LPL3-1/PM	NRR/LPL3-1/LA	NRR/LPL3-1/BC
NAME	LPadovan	THarris	LRaghavan
DATE	06/21/06	06/22/06	06/22/06

OFFICIAL RECORD COPY

Palisades Plant

cc:

Robert A. Fenech, Senior Vice President
Nuclear, Fossil, and Hydro Operations
Consumers Energy Company
1945 Parnall Rd.
Jackson, MI 49201

Arunas T. Udrys, Esquire
Consumers Energy Company
1 Energy Plaza
Jackson, MI 49201

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
Suite 210
2443 Warrenville Road
Lisle, IL 60532-4351

Supervisor
Covert Township
P. O. Box 35
Covert, MI 49043

Office of the Governor
P. O. Box 30013
Lansing, MI 48909

U.S. Nuclear Regulatory Commission
Resident Inspector's Office
Palisades Plant
27782 Blue Star Memorial Highway
Covert, MI 49043

Michigan Department of Environmental Quality
Waste and Hazardous Materials Division
Hazardous Waste and Radiological
Protection Section
Nuclear Facilities Unit
Constitution Hall, Lower-Level North
525 West Allegan Street
P.O. Box 30241
Lansing, MI 48909-7741

Michigan Department of Attorney General
Special Litigation Division
525 West Ottawa St.
Sixth Floor, G. Mennen Williams Building
Lansing, MI 48913

Michael B. Sellman
President and Chief Executive Officer
Nuclear Management Company, LLC
700 First Street
Hudson, MI 54016

Jonathan Rogoff, Esquire
Vice President, Counsel & Secretary
Nuclear Management Company, LLC
700 First Street
Hudson, WI 54016

Douglas E. Cooper
Senior Vice President - Group Operations
Palisades Nuclear Plant
Nuclear Management Company, LLC
27780 Blue Star Memorial Highway
Covert, MI 49043

Stephen T. Wawro, Director
of Nuclear Assets
Consumers Energy Company
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

Laurie A. Lahti, Manager
Regulatory Affairs
Nuclear Management Company, LLC
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

REQUEST FOR ADDITIONAL INFORMATION

RELATED TO THE REMOVAL OF

TRI-SODIUM PHOSPHATE FROM CONTAINMENT

PALISADES NUCLEAR PLANT (PNP)

DOCKET NO. 50-255

Part 1.

1. In Enclosure 1 of Nuclear Management Company's (NMC's) March 20, 2006, license amendment request regarding removal of tri-sodium phosphate from the Palisades' containment, NMC stated that the current licensing basis at PNP includes atmospheric dispersion factors (χ/Q values) that are based upon site-specific, wind-tunnel modeling. When, and by what mechanism, did this methodology become part of the Palisades' licensing basis? Did the Nuclear Regulatory Commission approve this methodology for Palisades?

2. NMC further stated that Palisades has committed to submit a methodology change to a full-scope implementation of the alternative source term (AST) methodology in July 2006, which will establish a conforming radiological design basis for control room habitability and offsite doses at Palisades. Implementation of the full-scope AST methodology is currently expected to occur upon start-up from the fall 2007 refueling outage. Does this commitment specifically address if there will be a change in the methodology to be used to calculate X/Q values?

3. Page 10 of Enclosure 4 states that the exclusion area boundary and low population zone χ/Q values used in the dose assessment for this license amendment request are those in the Palisades Final Safety Analysis Report. Were these χ/Q values previously reviewed and approved by the U.S. Nuclear Regulatory Commission staff as part of a prior license amendment request? If so, please provide an appropriate reference citation (e.g., safety evaluation report).

4. The loss of coolant accident radiological consequences analysis takes credit for wall deposition of elemental iodine as discussed in NUREG-0800, "Standard Review Plan" (SRP), Section 6.5.2, "Containment Spray as a Fission Product Cleanup System," Revision 2. The elemental iodine wall deposition removal coefficient calculated by the SRP 6.5.2 method is based on a mass transfer coefficient for the conditions in the containment when sprays are operating. Changes to containment spray operation do not appear to be proposed in this amendment request. Are changes being proposed to post-accident containment spray operation?

Part 2.

1. In the event of a loss-of-coolant accident (LOCA) with recirculation, sodium hydroxide (NaOH) will be injected via the containment spray system within 7 days to control the containment pool pH. Provide an overview of the injection method, including NaOH spray

duration, pH of the spray, and the range of containment pool pH once all NaOH has been injected. Discuss any assumptions.

2. Have any tests been conducted to evaluate potential interactions (i.e., chemical effects) between containment materials and a post-LOCA containment pool that does not contain a chemical to buffer pH? If so, please provide the results. If not, please discuss if there are any plans to investigate potential chemical effects in containments that do not have a buffering agent.

3. In relation to calculating release of the elemental iodine from the Safety Injection Refueling Water Tank (SIRWT), on page 5 of Enclosure 4 NMC said " . . . appropriately justified airborne fractions for SIRWT leakage addresses the impact of TSP removal on iodine airborne fraction of leak sump water." Page 6 of Enclosure 4 provides the value of SIRWT iodine-volatile fraction of 0.453, and the corresponding maximum fraction of airborne elemental iodine of 0.0456. These values were determined in Nuclear Management Company's (NMC's) analysis included in Attachment 1 to Enclosure 4(?). Since the analysis is difficult to follow without having more details, please provide the following information:

   - Is the current analysis performed using one iodine concentration (e.g., maximum) in the SIRWT, or does it consider time-dependant values for different amounts of iodine leaked from the containment sump?

   - Justify using a concentration of 6.72E-05 g-atom/L of iodine in the SIRWT liquid. Since this value comes from Reference 11 in Attachment 1, why does it apply to the current analysis?

   - In your analysis, the pH used to determine the fraction of volatile iodine is 4.5, and it does not change with the in-leaking containment sump water. Justify this assumption.

   - In the analysis provided in Attachment 1 to Enclosure 4, please clarify the meaning of the numbers under the heading "SIRWT Iodine Volatile Fraction."

Part 3.

NMC's letter of March 20, 2006, contained the following three new commitments:

1. NMC will implement a potassium iodide (KI) program for control room personnel at PNP upon approval of the license amendment request. The KI program will be implemented per the guidance provided in Nuclear Energy Institute 99-03, "Control Room Habitability Assessment Guidance," . . . .

2. NMC will inject sodium hydroxide as an alternate buffer within seven days post-LOCA with recirculation at PNP.

3. NMC will submit a license amendment request to implement an alternate buffer program after the Westinghouse Owners Group (WOG) Alternate Buffer Project is concluded.

The following additional information is needed to complete our review:

1. This item pertains to the timeliness of the proposed interim measure for addition of NaOH to control pH within 7 days following a LOCA.

   The analysis of risk in the application appears flawed in that it solely addresses an unquantified avoidance of an increase in core damage frequency caused by postulated chemical effects blockage of the recirculation flow path. Recent NRC testing indicates a potential for incremental increase in blockage due to potential calcium silicate insulation and TSP chemical effects (above a debris contribution alone, which is considered the more likely cause of blockage). However, removal of the pH control, following both postulated and hypothetical accidents, increases the consequences of the entire set of such accidents when considering iodine reevolution from the containment pool. For design-basis accidents, NMC assessed that, considering this increase coincident with certain revised assumptions, the calculated doses remained within regulatory limits. Although this aspect is being reviewed by the staff, there remains, nonetheless, an unquantified increase in consequence associated with removal of any buffer which could offset any decreased risk achieved by removing the chemical effect blockage. Without a quantifiable evacuation of these offsetting risks, NMC's statement that there is a net increase in plant safety appears unfounded.

   Regarding the impact of TSP removal on radiological consequences, NMC stated that in the event of a large-break LOCA with significant fuel damage, fission products released will likely control pH. The staff notes that the purpose of the proposed amendment is to avoid such fuel damage following an accident. Nonetheless, it would seem prudent to have pH control available in the event of significant core damage, versus relying on fission products to control pH. Also, NMC assumes that an additional source of conservatism is the dissolution of calcium silicate insulation following a LOCA. However, there is no assurance that any significant quantity of calcium silicate insulation will be dislodged and dissolved following a LOCA, nor will any be necessarily present for other hypothetical accidents, therefore considering its effects appears to be non-conservative.

   Based on the above, the staff considers it prudent to have a readily-available (in hours upon detection of significant core damage, versus the 7 days proposed in the amendment) method to control pH. Additionally, the staff should review the method and system aspects as a part of the amendment review and approval, versus the current proposal to accomplish this task in the 60-days following approval of the amendment.

   Please either address the points made by the staff in the above paragraphs, or describe how you will achieve buffer addition in a more timely manner than the proposed 7-days to mitigate iodine re-evolution from the sump pool.

2. Provide the methods and procedural plans to inject NaOH into the containment spray system. Include aspects of the operation of containment spray system to achieve NaOH addition to the sump pool.

3. Describe the specifications of the buffer to be used, how it will be stored on site, and its availability for use.

4. Provide calculations of the amount of NaOH to be added to complete the neutralization of the borated water added to the sump pool.

5. Describe testing and maintenance planned for the NaOH-injection capability.

6. NMC stated that it would submit a license amendment request to implement an alternate buffer after the WOG Alternate Buffer Project is concluded. This project may not provide definitive guidance for selection of an alternate buffer. Describe your plans and schedule to implement an alternate buffer.