November 30, 2005

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) FOR THE REVIEW OF THE PALISADES NUCLEAR PLANT, LICENSE RENEWAL APPLICATION (TAC NO. MC6433)

Dear Mr. Harden:

By letter dated March 22, 2005, Nuclear Management Company, LLC, (NMC or the applicant) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54), to renew the operating license for Palisades Nuclear Plant (PNP), for review by the U.S. Nuclear Regulatory Commission (NRC). Subsequently, on May 5, 2005, the NRC received a supplement to the license renewal application. The NRC staff is reviewing the information contained in the license renewal application (LRA) and supplement and has identified, in the enclosure, areas where additional information is needed to complete the review.

The question was discussed with your staff, Mr. Robert Vincent, and a mutually agreeable date for this response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-2232 or via e-mail at MJM2@nrc.gov.

Sincerely,

/RA/

Michael J. Morgan, Project Manager
License Renewal Section A
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-255

Enclosure: As stated

cc w/encl: See next page

November 30, 2005

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

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAIs) FOR THE REVIEW OF THE PALISADES NUCLEAR PLANT, LICENSE RENEWAL APPLICATION (TAC NO. MC6433)

Dear Mr. Harden:

By letter dated March 22, 2005, Nuclear Management Company, LLC, (NMC or the applicant) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54), to renew the operating license for Palisades Nuclear Plant (PNP), for review by the U.S. Nuclear Regulatory Commission (NRC). Subsequently, on May 5, 2005, the NRC received a supplement to the license renewal application. The NRC staff is reviewing the information contained in the license renewal application (LRA) and supplement and has identified, in the enclosure, areas where additional information is needed to complete the review.

The question was discussed with your staff, Mr. Robert Vincent, and a mutually agreeable date for this response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-2232 or via e-mail at MJM2@nrc.gov.

Sincerely,

/RA/

Michael J. Morgan, Project Manager
License Renewal Section A
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-255

Enclosure: As stated

cc w/encl: See next page

DISTRIBUTION: See next page

ADAMS Accession No.: ML053340149
Document Name: E:\Filenet\ML053340149.wpd

OFFICE	PM:RLRA	LA:DLR	BC:RLRA
NAME	MMorgan	MJenkins	SLee
DATE	11/30/05	09/21/05	11/30 /05

OFFICIAL RECORD COPY

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
801 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

Manager, Regulatory Affairs
Nuclear Management Company, LLC
27780 Blue Star Memorial Highway
Covert, MI 49043

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

John Paul Cowan
Executive Vice President & Chief Nuclear
Officer
Nuclear Management Company, LLC
700 First Street
Hudson, WI 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

Robert A. Vincent
Licensing Lead - License Renewal Project
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

cc:

Darrel G. Turner
License Renewal Project Manager
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

Mr. James Ross
Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708

Mr. Douglas F. Johnson
Director, Plant Life Cycle Issues
Nuclear Management Company, LLC
700 First Street
Hudson, WI 54016

Secretary
Federal Energy Regulatory Commission
888 First Street, NE, Room 1A
Washington, DC 20426

Chairperson
Michigan Public Service Commission
PO Box 30221
Lansing, MI 48909-7721

DISTRIBUTION: Letter to P. Harden, Re: RAIs for Palisades LRA, Dated: November 30, 2005
ADAMS Accession No.: ML053340149

HARD COPY
DLR RF
M. Morgan (PM)

E-MAIL:
RidsNrrDlr
RidsNrrDe
G. Bagchi
K. Manoly
RidsNrrDci
J. Calvo
R. Jenkins
J. Fair
RidsNrrDss
D. Thatcher
R. Pettis
G. Galletti
C. Li
K. Winsberg (RidsOgcMailCenter)
R. Weisman
M. Mayfield
A. Murphy
S. Smith (srs3)
S. Duraiswamy
Y. L. (Renee) Li
RLEP Staff

M. Padovan
P. Lougheed, RIII
J. Ellegood, RIII
M. Garza, RIII
A. Stone, RIII
L. Raghavan
OPA

PALISADES NUCLEAR PLANT
LICENSE RENEWAL APPLICATION (LRA)
REQUEST FOR ADDITIONAL INFORMATION (RAI)

RAI 4.2-1
LRA Section 4.2.1 did not provide the effective full power years (EFPYs) for the proposed 60 calendar years of operation for the plant. Please provide the EFPY for 40 calendar years of operation and the EFPY for 60 calendar years of operation for the Palisades plant.

RAI 4.2-2
Separately, it appears that the LRA end of extended license Charpy upper shelf energy (USE) values for all beltline materials are based on Position 1.2 of Regulatory Guide (RG) 1.99, Revision 2. The staff's independent calculation indicated that using Position 1.2 of the RG is non-conservative for the lower shell axial weld 3-112A/C (fabricated with weld wire Heat No. 34B009), for which a surveillance weld of the same heat is available from Millstone, Unit 1. (See your submittal dated May 25, 1994 or the NRC's Reactor Vessel Integrity Database). Provide the end of extended license USE values based on your past approach, i.e., using surveillance data from Millstone, Unit 1, to meet the requirements of the RG and to demonstrate that this revision of USE values based on surveillance data will not change your conclusion in LRA Section 4.2.1.

RAI 4.2-3

(1) The applicant has provided a time limited aging analysis (TLAA) which determines that the limiting material for the Palisades reactor pressure vessel (RPV) will exceed the pressurized thermal shock (PTS) screening criterion in 2014. Describe any current or planned flux reduction program which is required to support the determination that the Palisades RPV limiting material will comply with requirements of 10 CFR 50.61 until 2014.

(2) LRA Section 4.2.2 states that you will select the optimum alternative to manage PTS in accordance with 10 CFR 50.61 and provide applicable submittals for NRC review and approval, prior to exceeding the PTS screening criteria during the period of extended operation. Please provide additional information regarding specific plant equipment modifications, operational modifications, revised PTS analysis, or thermal annealing which could be implemented to allow the Palisades RPV to comply with the requirements of 10 CFR 50.61 through the end of the period of extended operation.

RAI 4.7.2-1
LRA Section 4.7.2 Table 4.7.2-1 provides a summary of the fracture mechanics assessment of the most susceptible pressurizer and primary coolant system Alloy 600 locations. Please:

(1) Confirm that all the components in Table 4.7.2-1 are inspection items under Palisades' Alloy 600 Aging Management Program (AMP).

(2) Clarify how this fracture mechanics assessment has been used to support the inspection methods and intervals of the pressurizer and primary coolant system Alloy 600 locations and how the fracture mechanics assessment is used to

support the inspection methods and intervals of the Palisades Alloy 600 AMP.

(3) Provide justification for selecting 0.01 inch (LRA Page 4-54) as the postulated initial flaw depth in your fracture mechanics analyses and provide the flaw depth that you consider to be detectable by approved methods (LRA Page 4-56) and the basis for your determination.

Further, it appears that the fracture mechanics assessment summary is based on Report 32-1238965-00, "Fracture Mechanics Assessment of Palisades Alloy 600 Components," which was approved by the NRC in a safety evaluation (SE) dated June 27, 1995. In recent years, the industry started a systematic approach to manage reactor vessel head and pressurizer Alloy 600 penetration nozzles, e.g., the work related to crack growth rate in MRP-55 (July 18, 2002), "Crack Growth Rates for Evaluating Primary Water Stress Corrosion Cracking (PWSCC) of Thick-Wall Alloy 600 Material," and the fatigue growth rate of Appendix O, "Evaluation of Flaws in PWR Reactor Vessel Upper Head Penetration Nozzles," to Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). Please assess the impact of this new information on the fracture mechanics assessment of Palisades Alloy 600 components summarized in LRA Table 4.7.2-1.

RAI 4.7.2-2

On Page 4-57, concerning the pressurizer temperature element nozzles which were repaired in 1993, LRA Section 4.7.2 states that, "[t]he fatigue analysis of the weld pad repairs and the ASME XI Appendix A crack growth evaluation are therefore TLAAs." Please:

(1) Provide the actual cycle count recorded in the fatigue monitoring program for the pressurizer events from 1993 to date as a fraction (e.g., 7/10) of the 20-year pressurizer design basis event cycles that were assumed in the weld pad fatigue analysis to determine whether the action levels for cycles will be reached by major events early in the extended period of operation. If this is likely to happen, describe the actions to be taken.

(2) Provide information about the pad material and the pad weld material, and confirm whether the repair was in accordance with Section XI of the ASME Code and whether the welded pad was analyzed in accordance with Section III of the ASME Code.

(3) Provide information about the inspection results for the repair since 1993 and discuss the consistency of the inspections for the repair with those for pressurizer temperature element nozzles in the Alloy 600 AMP for the extended period of operation.

(4) Identify the submittal and the NRC SE regarding the corrosion evaluation (Page 4-58) for the extended 60-year licensed operating period and provide a consequence assessment of the pressurizer temperature element nozzle having a predicted bore diameter increase of 0.28 inch due to corrosion for the extended 60-year licensed operating period.

RAI 4.7.2-3

On Page 4-59, concerning the pressurizer spray and surge nozzle service time assessment, you concluded that the predicted service time for the surge nozzle is 40 years. Provide your disposition for the surge line nozzle TLAA, because it's not clear that it is included in "Disposition for all Alloy 600 Heater Sleeves, Nozzles, Safe Ends, and Flanges: 10 CFR 54.21(c)(1)(iii)." For the spray nozzle which has a predicted service time of 5.36 years at 640E F, provide information regarding the inspection results for the spray nozzle since 1995 and discuss the consistency of the current inspections for the spray nozzle with those for the spray nozzle in the Alloy 600 AMP for the extended period of operation.

RAI 4.7.2-4

On Page 4-59, regarding the bounding fracture mechanics analysis of the hot leg, piping resistence temperature detector and sampling nozzles, pressurizer instrument nozzles, and pressurizer heater sleeves, LRA Section 4.7.2 states that, "[t]he bounding fracture mechanics portion of the analysis employs elastic-plastic methods with IWB 3600 and Regulatory Guide 1.161 acceptance criteria." The staff believes that this bounding fracture mechanics analysis refers to that of WCAP-15973, "Low-Alloy Steel Component Corrosion Analysis Supporting Small-Diameter Alloy 600/690 Nozzle Repair/Replacement Programs." Therefore, the quoted LRA Section 4.7.2 sentence must be modified by adding to its end, "as modified by the NRC SE dated January 12, 2005." The Regulatory Guide 1.161 acceptance criteria, especially the structural factors, are not acceptable for analyzing detected flaws, including flaws with indication of leakage.

RAI 4.7.2-5

On Page 4-61, concerning disposition for all Alloy 600 heater sleeves, nozzles, safe ends, and flanges, LRA Section 4.7.2 states that, "[l]ocations which are more susceptible to PWSCC, or whose failure could result in a more-significant safety hazard, are also subject to initial or periodic bare-metal VT-2, volumetric, or penetrant inspections." Please provide a list of the "more susceptible" locations mentioned above, the criteria for determining the more susceptible locations, and the development of these criteria based on the fracture mechanics assessment of Report 32-1238965-00.

RAI 4.7.2-6

On Page 4-61, LRA Section 4.7.2 states that, "NMC will re-evaluate effects of primary water stress corrosion cracking for all Alloy 600 components for which the current analyses found acceptable crack sizes at 40 years to identify those for which the analysis would predict unacceptable crack sizes at 60 years, and to identify appropriate additional inspections for them. NMC will complete these re-evaluations before the period of extended operation." Due to availability of new information on PWSCC crack growth rates and fatigue crack growth rates, the staff determines that this re-evaluation should be performed three years before the period of extended operation, instead of just before the period of extended operation. Please revise your commitment letter to reflect the change of the submittal date for this re-evaluation.

RAI B2.1.4-1

LRA AMP B2.1.4, "Boric Acid Corrosion Program," states that the program identifies components exhibiting boric acid leakage, evaluates the acceptability for the continued service of these components, performs trending and tracking, and recommends corrective actions. GALL XI.M10, "Boric Acid Corrosion," requires the determination of the principal location of leakage (prioritization). Discuss your program's classification of components based on their

susceptibility to corrosion from boric acid leakage and your program's determination of the scope and frequency for visual and other nondestructive examination (NDE) inspections for these components. Please also provide information regarding provisions for managing potential boric acid leakage in inaccessible locations and areas covered by external insulation surfaces.

RAI B2.1.4-2

LRA AMP B2.1.4 lists a number of aging related issues which were addressed in various NRC and industry communications and indicates that the operating experience related to these issues have been incorporated into the AMP as applicable. For staff assessment of this incorporation, please provide information about the program improvements directly related to lessons learned from the Davis-Besse vessel head degradation and the control rod drive mechanism penetration cracking discussed in NRC Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles," NRC Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity," NRC Bulletin 2002-02, "Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs," and NRC Order EA-03-009. Also, provide a discussion using examples of implementation of corrective actions in the program to prevent the recurrence of degradation caused by boric acid leakage, as required by NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR plants."

RAI B2.1.16-1

LRA AMP B2.1.16, "Reactor Vessel Integrity Surveillance Program," states that Enhancement 1 to this AMP requires that Palisades pressure-temperature (P-T) limits and low temperature overpressure protection (LTOP) curves be updated and submitted to NRC for review and approval prior to the period of extended operation to reflect the additional neutron fluence accumulated during the extended operating period. Please provide the approximate date of withdrawal for the next surveillance capsule (Capsule W-280) and confirm that the updated P-T limits and LTOP curves to be submitted to the NRC prior to the period of extended operation will incorporate information from the surveillance report on irradiated specimens from Capsule W-280.

Further, you stated that this program ensures the reactor vessel materials "have adequate margins against brittle fracture caused by PTS in accordance with 10 CFR 50.61." Please confirm that, like P-T limits and LTOP curves, PTS evaluation is also part of the Reactor Vessel Integrity Surveillance Program.

RAI B2.1.16-2

LRA AMP B2.1.16, "Reactor Vessel Integrity Surveillance Program," states that Enhancement 3 to this AMP will evaluate and revise the Palisades surveillance withdrawal and testing schedule of Final Safety Analysis Report (FSAR) Table 4-20 as necessary such that at least one capsule remains in the reactor vessel to be tested during the period of extended operation. GALL XI.M31, "Reactor Vessel Surveillance," Item 5 provides this guideline for applicants whose surveillance capsules' projected fluence (equivalent vessel fluence) at the end of 40 years is less than the 60-year fluence. Please confirm that the projected fluence at the end of 40 years for Palisades Capsules W-280, W-260, and W-80 is less than the projected 60-year reactor vessel fluence. Please also provide the projected fluence and EFPYs for Capsules W-280, W-260, and W-80 at the date of their scheduled withdrawals and identify the capsules that you intend to keep in the reactor vessel and to have them tested during the period of extended operation.