



Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530
Tel 269 764 2000

PNP 2015-004

Anthony J. Vitale
Site Vice President

February 13, 2015

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Response to Request for Additional Information Regarding the License
Amendment Request to Implement 10 CFR 50.61a
(TAC No. MF4528)

Palisades Nuclear Plant
Docket No. 50-255
License No. DPR-20

- REFERENCES: 1. Entergy Nuclear Operations, Inc. letter PNP 2014-049, *License Amendment Request to Implement 10 CFR 50.61a, "Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events,"* dated July 29, 2014 (ADAMS Accession No. ML14211A520).
2. NRC letter, *Palisades Nuclear Plant – Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a (TAC No. MF4528),* dated January 20, 2015 (ADAMS Accession No. ML15016A184).

Dear Sir or Madam:

In Reference 1, Entergy Nuclear Operations, Inc. (ENO) submitted a license amendment request for the Palisades Nuclear Plant operating license pursuant to 10 CFR 50.61a(c) and 10 CFR 50.90. The proposed amendment would authorize the implementation of 10 CFR 50.61a, "Alternate fracture toughness requirements for protection against pressurized thermal shock events," in lieu of 10 CFR 50.61, "Fracture toughness requirements for protection against pressurized thermal shock events."

PROPRIETARY

Attachment 3 contains confidential information submitted under 10 CFR 2.390. Withhold from public disclosure. When separated from Attachment 3, the remainder of the submittal may be decontrolled.

A001
LRR

In Reference 2, ENO received a request for additional information (RAI) concerning the license amendment request.

The ENO response to the requested information is provided in the attachments.

Attachment 1 provides the responses to the RAI questions.

Attachment 2 provides the Westinghouse proprietary authorization affidavit supporting the proprietary nature of Attachment 3. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the NRC and addresses the specific considerations listed in paragraph (b) of 10 CFR 2.390, *Public inspections, exemptions, requests for withholding*. Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR 2.390.

Attachment 3 provides proprietary information that supports the response to RAI 2a.

This letter identifies no new commitments and no revisions to existing commitments.

In accordance with 10 CFR 50.91(b), a copy of this application, with the attachment, is being provided to the designated State of Michigan official.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 13, 2015.

Sincerely,



ajv/jse

Attachments: 1. Response to Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a
 2. Westinghouse Affidavit Documentation
 3. Palisades Reactor Vessel Materials Certification Reports for Response to RAI 2a (Proprietary)

cc: Administrator, Region III, USNRC
 Project Manager, Palisades, USNRC
 Resident Inspector, Palisades, USNRC
 State of Michigan

Attachment 1

Response to Request for Additional Information Regarding the License Amendment Request to Implement 10 CFR 50.61a

By letter dated July 29, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML 14211A520), Entergy Nuclear Operations, Inc. (ENO) submitted a license amendment request (LAR) for Palisades Nuclear Plant (PNP) to implement Title 10 of the *Code of Federal Regulations* (10 CFR) 50.61a, "Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock (PTS)," also referred to as the alternate PTS rule. PNP is expected to exceed the screening criteria of the PTS rule (10 CFR 50.61) in August 2017, prior to the expiration of its extended operating license (2031). Compliance with the requirements of 10 CFR 50.61a may be met as an alternative to 10 CFR 50.61.

By letter dated January 20, 2015, the Nuclear Regulatory Commission (NRC) issued a request for additional information (RAI) concerning the amendment application (ADAMS Accession No. ML15016A184).

The ENO responses to the RAI questions are provided below.

1. NRC Information Request – RAI #1

10 CFR 50.61a(c)(2) states, in part, the following:

Each licensee shall perform an examination and an assessment of flaws in the reactor vessel beltline as required by paragraph (e) of this section. The licensee shall verify that the requirements of paragraphs (e), (e)(1), (e)(2), and (e)(3) of this section have been met.

Issue 1a

There is no discussion of the proximity of the indications in weld 2-112B to each other.

RAI 1a

Provide a discussion of the proximity of the indications, according to the directions in ASME Section XI, paragraph IWA-3300(b), to demonstrate how the indications in weld 2-112B were resolved.

ENO Response to RAI 1a

According to American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition, with no addenda, Figure IWA-3330-1, "Multiple Planar Flaws Oriented in Plane Normal to Pressure

Retaining Surface,” for subsurface flaw #2, the separation between flaws is greater than the through-wall dimension of the largest flaw; therefore, the flaws shall not be joined by proximity.

The largest through-wall size in the band of 17 flaws was 0.06 inches. The closest flaws had a separation of 0.1725 inches.

Issue 1b

A plant-specific assessment of total plate flaws is shown in Table 8-11, "Alternate PTS Rule Allowable Number of Flaws in Plates and Forgings Scaled for Palisades" of the LAR enclosure.

In this table, all of the flaws detected during the February 2014 inservice inspection at PNP have been included, reflecting the assumption made by the licensee that all detected flaws lie in the plate rather than in the weld. The exact procedure used to determine the total plate area included in the inspection is not given. Specifically, it is not clear if the area of the weld has been included or excluded from the total plate area.

RAI 1b

Augment Table 8-10, "Inspection Length and Area for Palisades," or otherwise revise the documentation provided in the submittal, to clarify how the total plate area was calculated and whether it includes the area of the weld.

ENO Response to RAI 1b

The total inspected plate area within the beltline and extended beltline regions of the Palisades reactor vessel was calculated using the dimensions provided in Table 8-10, "Inspection Length and Area for Palisades," in the submittal along with the requirements for examination volume in Figure IWB-2500-1, "Vessel Shell Circumferential Weld Joints," and Figure IWB-2500-2, "Vessel Shell Longitudinal Weld Joints," of Section XI of the ASME Code. Per the ASME Code, Section XI requirements for examination volume, one-half of the vessel thickness is required to be inspected on either side of the circumferential and longitudinal weld seams. The area of the weld is not included in the calculation of the total inspected plate area within the beltline and extended beltline regions of the Palisades reactor vessel. As noted in Table 8-10 of the submittal, the total calculated plate area was rounded down, which is conservative for the calculation of the 10 CFR 50.61a plate flaw limits.

2. NRC Information Request – RAI #2

10 CFR 50.61 a(c)(1) states, in part, the following:

Each licensee shall have projected values of RT_{MAX-X} for each reactor vessel beltline material for the EOL fluence of the material. The assessment of RT_{MAX-X} values must use the calculation procedures given in paragraphs (f) and (g) of this section. The assessment must specify the bases for the projected value of RT_{MAX-X} for each reactor vessel beltline material, including the assumptions regarding future plant operation (e.g., core loading patterns, projected capacity factors); the copper (Cu), phosphorus (P), manganese (Mn), and nickel (Ni) contents; the reactor cold leg temperature (T_c); and the neutron flux and fluence values used in the calculation for each beltline material.

Issue 2a

Section 4, "Plant-Specific RV Material Properties and Dimensions" of the LAR enclosure states the following:

Table 4-1 summarizes the best estimate copper, manganese, phosphorus, and nickel contents and $RT_{NDT(U)}$ values of the beltline and extended beltline materials for the Palisades RV. $RT_{NDT(U)}$ values for the Palisades RV plate materials were determined in accordance with the fracture toughness requirements in NUREG-0800, Revision 2, Branch Technical Position MTEB 5-3 (Reference 6); and the requirements of Subparagraph NB-2331 of Section III of the ASME B&PV Code (Reference 7). $RT_{NDT(U)}$ values for the weld materials are generic values for Linde 1092 and 124 weld fluxes per Reference 1.

Table 4-1, "Details of RT_{MAX-X} Calculation Inputs for Palisades" of the LAR does not clearly identify which plates used the methods of the Branch Technical Position (BTP) 5-3 and which plates followed the requirements of 10 CFR Part 50, Appendix G, as augmented by the criteria in Section III of the ASME Code.

RAI 2a

Document which method was used for each $RT_{NDT(U)}$ value in Table 4-1. Provide data demonstrating how each value of $RT_{NDT(U)}$ was calculated when a provision of BTP 5-3 was used.

ENO Response to RAI 2a

The table below summarizes the methods that were used for determining the unirradiated RT_{NDT} value for each of the reactor vessel plates. For those plates where Branch Technical Position 5-3 (BTP 5-3), "Fracture Toughness Requirements," was utilized for determining $RT_{NDT(U)}$, copies of the Palisades

reactor vessel materials certification reports are included in Attachment 3. These materials certification reports in Attachment 3 are classified as proprietary information to be withheld from public disclosure under 10 CFR 2.390.

Summary of Methods Used for Determination of $RT_{NDT(u)}$ for Reactor Vessel Plates

No.	Region and Component Description	Material Identification	$RT_{NDT(u)}$ Method Used
1	Upper Shell Plate	D-3802-1	BTP 5-3 Paragraph B1.1(3)(b)
2	Upper Shell Plate	D-3802-2	BTP 5-3 Paragraph B1.1(3)(b)
3	Upper Shell Plate	D-3802-3	BTP 5-3 Paragraph B1.1(3)(b)
4	Intermediate Shell Plate	D-3803-1	Direct Measurement per ASME Section III NB-2331
5	Intermediate Shell Plate	D-3803-2	BTP 5-3 Paragraph B1.1(3)(b)
6	Intermediate Shell Plate	D-3803-3	Direct Measurement per ASME Section III NB-2331
7	Lower Shell Plate	D-3804-1	BTP 5-3 Paragraph B1.1(3)(b)
8	Lower Shell Plate	D-3804-2	BTP 5-3 Paragraph B1.1(3)(b)
9	Lower Shell Plate	D-3804-3	BTP 5-3 Paragraph B1.1(3)(b)

Issue 2b

Table 5-1, "Maximum Neutron Fluence on the RV Clad-to-Base Metal Interface for Palisades at 42.1 EFPY" of the LAR, lists that the values for the intermediate and lower longitudinal (axial) welds in the vessel are the same, 2.161×10^{19} neutron/cm² ($E > 1.0$ MeV), which is 63% of the peak values for the adjacent intermediate and lower shell plates. The methodology for determining the maximum fluence at the axial welds relative to the maximum fluence in the adjacent plates is not discussed in the LAR.

RAI 2b

Provide a discussion of how the maximum fluence for each region and component in Table 5-1 was determined from the detailed fluence information contained in References 8 and 13 listed in Section 10 of the LAR enclosure. For clarity, illustrate the axial position of the active fuel and the azimuthal position of the peak fluence values for the adjacent intermediate and lower shell plates on Figure 4-1, "Identification and Location of Beltline Region Materials for the Palisades Reactor Vessel."

ENO Response to RAI 2b

The spatial distribution of the neutron fluence for the Palisades reactor vessel was determined on a cycle by cycle basis using the synthesis methodology described in Reference 8 of the LAR enclosure. This analysis provided a fine spatial grid of fluence values over the inner surface of the reactor vessel. A scan of these fine grid fluence distributions coupled with the knowledge of the locations (axial and azimuthal extent) of individual reactor vessel materials allowed the determination of the maximum for each weld and plate in the beltline region. The locations of the individual materials are illustrated in Figure 4-1 of the LAR enclosure (shown below).

Axial locations of active fuel added to Figure 4-1:

Core Top	148.50 inches
Core Midplane	214.40 inches
Core Bottom	280.30 inches

Azimuthal locations of peak fluence added to Figure 4-1:

Intermediate Shell Plates	75°, 165°, 255°, and 345°
Circumferential Weld	75°, 165°, 255°, and 345°
Lower Shell Plates	75°, 165°, 255°, and 345°

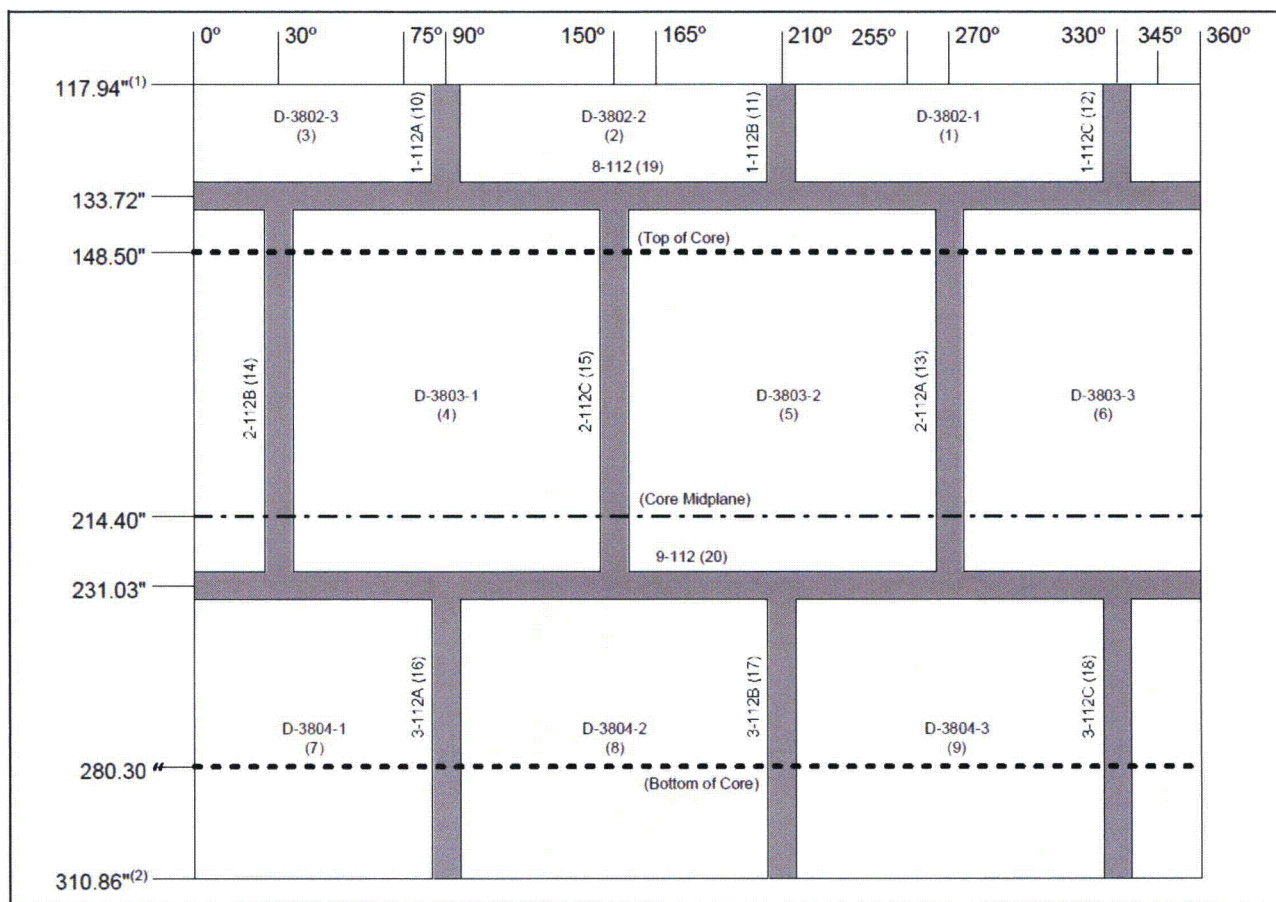


Figure 4-1 Identification and Location of Beltline Region Materials for the Palisades Reactor Vessel⁽³⁾

Figure 4-1 Footnotes:

1. 117.94 inches corresponds to the upper extent of the extended beltline region. See Table 4-2, "Palisades RV Dimensions," for references used to determine this location.
2. 310.86 inches corresponds to the lower extent of the extended beltline region. See Table 4-2 for references used to determine this location.
3. Map is not drawn to scale. Numbers in parentheses correspond to the "No." column in Table 4-1. Dimensions are measured downward from the reactor vessel flange surface.

Issue 2c

Equations 5, 6, and 7 in 10 CFR 50.61a estimate ΔT_{30} as a function of various input values, including neutron flux. The licensee has provided most of these input values in Tables 4-1, 5-1 and Table 5-2, "RV Cold Leg Temperature per Operating Cycle for Palisades" of the LAR enclosure. The LAR lacks neutron flux values in Table 8-1, " RT_{MAX-AW} Calculation Results for Palisades at 42.1 EFPY," Table 8-2, " RT_{MAX-PL} Calculation Results for Palisades at 42.1 EFPY," and Table 8-3, " RT_{MAX-CW} Calculation Results for Palisades at 42.1 EFPY" for the calculation of RT_{MAX-X} for the materials listed in Table 4-1.

RA 2c

Provide neutron flux values on a per cycle basis for the limiting material/region (W5214 intermediate shell longitudinal weld).

ENO Response to RAI 2c

The requested flux and fluence values are as follows:

Cycle	Neutron Flux (E > 1.0 MeV) [n/cm2-s]	End of Cycle Neutron Fluence (E > 1.0 MeV) [n/cm2]
1-14 Average	2.548e10	1.158e19
15	1.105e10	1.196e19
16	1.135e10	1.240e19
17	9.781e09	1.282e19
18	1.088e10	1.326e19
19	1.090e10	1.369e19
20	1.161e10	1.419e19
21	1.172e10	1.472e19
22	1.128e10	1.520e19
23 thru 42.1 EFPY	1.172e10	2.161e19

3. NRC Information Request – RAI #3

Section 3.0, "Background" of the LAR indicates that PNP reactor vessel fluence was recalculated based on actual reactor operation through fuel Cycle 22 and expected fluence based on projected operations through Cycle 26. This evaluation was documented in WCAP-15353 – Supplement 3 – NP, Revision 0, dated June 2013. The PNP alternate PTS rule evaluation is documented in WCAP-17628 – NP, Revision 1, "Alternate Pressurized Thermal Shock (PTS) Rule Evaluation for Palisades," dated June 2014. WCAP-17628-NP, Revision 1, for its reactor vessel neutron fluence values references WCAP-15353 – Supplement 2 – NP, Revision 0, "Palisades Reactor Pressure Vessel Fluence Evaluation," dated July 2011.

Please provide clarification for which supplement of WCAP-15353-NP is used in evaluating PNP's alternate fracture toughness requirements for protection against PTS.

ENO Response to RAI 3

WCAP-15353-Supplement 2-NP, Revision 0, was used for the reactor vessel neutron fluence values in the alternate PTS rule evaluation.

WCAP-15353 – Supplement 3 – NP, Revision 0, "Palisades Reactor Pressure Vessel Fluence Evaluation," was not used in the alternate PTS rule evaluation in WCAP-17628-NP, Revision 1. Supplement 3 was instead used to determine when the 10 CFR 50.61 screening criterion date would be reached for the limiting reactor vessel material, based on recent plant operations. Using plant operations data through Cycle 20, a previous evaluation determined that the 10 CFR 50.61 screening criterion date would be reached in April 2017. Supplement 3 accounted for an additional two cycles of actual reactor operation data (through cycle 22), during which actual plant operating time was less than that assumed in the previous evaluation, and concluded that the screening criterion limit would be reached in August 2017.

Attachment 2

Westinghouse Affidavit Documentation



Westinghouse Electric Company
Engineering, Equipment and Major Projects
1000 Westinghouse Drive, Building 3
Cranberry Township, Pennsylvania 16066
USA

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Direct tel: (412) 374-4643
Direct fax: (724) 940-8560
e-mail: greshaja@westinghouse.com
Proj letter:

CAW-15-4086

February 5, 2015

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: CPAL-15-2, Attachment 2, "Palisades Reactor Vessel Material Certification Reports"
(Proprietary)

The proprietary information for which withholding is being requested in the above-referenced document is further identified in Affidavit CAW-15-4086 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The Affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

The Material Certification Reports contained in the subject document were originally classified as C-E Proprietary, considered equivalent to Westinghouse Proprietary Class 2. Westinghouse requests that the Material Certification Reports be considered proprietary in their entirety. As such, a non-proprietary version will not be issued.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by Entergy Nuclear Operations, Inc.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse Affidavit should reference CAW-15-4086, and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 3 Suite 310, Cranberry Township, Pennsylvania 16066.

Very truly yours,

A handwritten signature in black ink, appearing to read 'JA Gresham', written over a horizontal line.

James A. Gresham, Manager
Regulatory Compliance

Enclosures

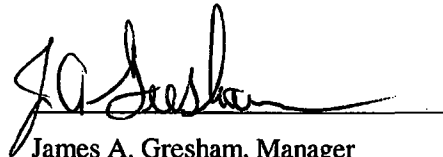
AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

I, James A. Gresham, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

A handwritten signature in black ink, appearing to read "JA Gresham", is written over a horizontal line.

James A. Gresham, Manager
Regulatory Compliance

- (1) I am Manager, Regulatory Compliance, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.
- (2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.
- (3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.
- (4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.
 - (i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.
 - (ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

 - (a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

- (b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.
 - (c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.
 - (d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.
 - (e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.
 - (f) It contains patentable ideas, for which patent protection may be desirable.
- (iii) There are sound policy reasons behind the Westinghouse system which include the following:
- (a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.
 - (b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.
 - (c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

- (d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.
 - (e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.
 - (f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.
- (iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.
- (v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.
- (vi) The proprietary information sought to be withheld in this submittal is that contained in CPAL-15-2, Attachment 2, "Palisades Reactor Vessel Material Certification Reports" (Proprietary), for submittal to the Commission, being transmitted by Entergy Nuclear Operations, Inc. letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with NRC letter PALISADES NUCLEAR PLANT-REQUEST FOR ADDITIONAL INFORMATION REGARDING THE LICENSE AMENDMENT REQUEST TO IMPLEMENT 10 CFR 50.61a (TAC NO. MF4528), and may be used only for that purpose.

- (a) This information is part of that which will enable Westinghouse to:
 - (i) Perform reactor vessel integrity evaluations to support license renewal.
 - (ii) Document the specific properties of the reactor vessel beltline materials.
- (b) Further this information has substantial commercial value as follows:
 - (i) Westinghouse plans to use the information to perform evaluations that demonstrate compliance with NRC requirements for vessel integrity.
 - (ii) The information requested to be withheld represents a valuable resource for Palisades in demonstrating the material properties of its reactor vessel components.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar analyses and licensing defense services for Palisades without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.