October 4, 2007

Mr. Michael Balduzzi
Sr. Vice President, Regional Operations NE
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

SUBJECT: PALISADES NUCLEAR PLANT - ISSUANCE OF AMENDMENT RE: PROPOSAL TO REVISE CONTAINMENT SUMP SURVEILLANCE REQUIREMENT TO VERIFY STRAINER INTEGRITY (TAC NO. MD5259)

Dear Mr. Balduzzi:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 228 to Renewed Facility Operating License No. DPR-20 for the Palisades Nuclear Plant. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated April 18, 2007, as supplemented by letters dated July 16 and September 20, 2007.

The amendment would revise Technical Specification 3.5.2, "ECCS [Emergency Core Cooling Systems] - Operating," specifically, Surveillance Requirement 3.5.2.9, would be revised to reflect the configuration of the containment recirculation sump following modifications.

A copy of our related safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Registe*r notice.

Sincerely,

/RA/

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

Docket No. 50-255

Enclosures:
1. Amendment No. 228 to DPR-20
2. Safety Evaluation

cc w/encls: See next page

Mr. Michael Balduzzi
Sr. Vice President, Regional Operations NE
Entergy Nuclear Operations, Inc.
440 Hamilton Avenue
White Plains, NY 10601

SUBJECT: PALISADES NUCLEAR PLANT - ISSUANCE OF AMENDMENT RE: PROPOSAL TO REVISE CONTAINMENT SUMP SURVEILLANCE REQUIREMENT TO VERIFY STRAINER INTEGRITY (TAC NO. MD5259)

Dear Mr. Balduzzi:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 228 to Renewed Facility Operating License No. DPR-20 for the Palisades Nuclear Plant. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated April 18, 2007, as supplemented by letters dated July 16 and September 20, 2007.

The amendment would revise Technical Specification 3.5.2, "ECCS [Emergency Core Cooling Systems] - Operating," specifically, Surveillance Requirement 3.5.2.9, would be revised to reflect the configuration of the containment recirculation sump following modifications.

A copy of our related safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

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

Docket No. 50-255

Enclosures:
1. Amendment No. 228 to DPR-20
2. Safety Evaluation

cc w/encls: See next page

DISTRIBUTION

PUBLIC	LPL3-1 R/F	RidsNrrDorlLpl3-1	M. Scott, NRR
RidsNrrPMMChawla	RidsNrrLATHarris	RidsOgcRp	C. Basavaraju, NRR
RidsAcrsAcnwMailCenter	RidsNrrDirsItsb	G. Hill, OIS	RidsRgn3MailCenter
RidsNrrDorlDpr	RidsNrrDirsItsb		

Package No. ML072550053
Accession No. ML072550057
Tech Specs No. ML072850076 *per Memo dated August 13, 2007

OFFICE	LPL3-1	LPL3-1/PM	LPL3-1/LA	NRR/SSIB	NRR/EMCB	NRR/ITSB	OGC	LPL3-1/(A)BC
NAME	JPoole	MChawla	THarris	MScott*	KManoly	TKobetz	JRund (NLO w/Comments)	TTate
DATE	10/4/07	10/4/07	10/4/07	8/13/07	9/21/07	9/26/07	9/26/07	10/4/07

OFFICIAL RECORD COPY

ENTERGY NUCLEAR OPERATIONS, INC.

DOCKET NO. 50-255

PALISADES NUCLEAR PLANT

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 228
Renewed License No. DPR-20

1. The Nuclear Regulatory Commission (the Commission) has found that:

    A. The application for amendment by Entergy Nuclear Operations, Inc. (the licensee), dated April 18, 2007, as supplemented by letters dated July 16 and September 20, 2007, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

    B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

    C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public; and (ii) that such activities will be conducted in compliance with the Commission's regulations;

    D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public;

    E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to the license amendment and Paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-20 is hereby amended to read as follows:

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 228, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. ENO shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Travis L. Tate, Acting Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Renewed Facility Operating License and Technical Specifications

Date of Issuance: October 4, 2007

ATTACHMENT TO LICENSE AMENDMENT NO. 228

RENEWED FACILITY OPERATING LICENSE NO. DPR-20

DOCKET NO. 50-255

Replace the following page of the Renewed Facility Operating License No. DPR-20 with the attached revised page. The changed area is identified by a marginal line.

REMOVE	INSERT
Page 3	Page 3

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE	INSERT
3.5.2-3	3.5.2-3

(1) Pursuant to Section 104b of the Act, as amended, and 10 CFR Part 50, "Licensing of Production and Utilization Facilities," (a) ENP to possess and use, and (b) ENO to possess, use and operate, the facility as a utilization facility at the designated location in Van Buren County, Michigan, in accordance with the procedures and limitation set forth in this license;

(2) ENO, pursuant to the Act and 10 CFR Parts 40 and 70, to receive, possess, and use source and special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Updated Final Safety Analysis Report, as supplemented and amended;

(3) ENO, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use byproduct, source, and special nuclear material as sealed sources for reactor startup, reactor instrumentation, radiation monitoring equipment calibration, and fission detectors in amounts as required;

(4) ENO, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source, or special nuclear material for sample analysis or instrument calibration, or associated with radioactive apparatus or components; and

(5) ENO, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operations of the facility.

C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations in 10 CFR Chapter I and is subject to all applicable provisions of the Act; to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) ENO is authorized to operate the facility at steady-state reactor core power levels not in excess of 2565.4 Megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) The Technical Specifications contained in Appendix A, as revised through Amendment No. 228, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. ENO shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) ENO shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility and as approved in the SERs dated 09/01/78, 03/19/80, 02/10/81, 05/26/83, 07/12/85, 01/29/86, 12/03/87, and 05/19/89 and subject to the following provisions:

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 228 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-20

ENTERGY NUCLEAR OPERATIONS, INC.

PALISADES NUCLEAR PLANT

DOCKET NO. 50-255

1.0 INTRODUCTION

By letter to the Nuclear Regulatory Commission (NRC) dated April 18, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML071130356), as supplemented by letters dated July 16 (ADAMS Accession No. ML071980372) and September 20, 2007 (ADAMS Accession No. ML072780171), the Entergy Nuclear Operations, Inc., (ENO, the licensee), requested a change to the technical specifications (TSs) for the Palisades Nuclear Plant (PNP). The proposed change would revise TS Surveillance Requirement (SR) 3.5.2.9 to accommodate the replacement of the containment emergency sump suction inlet screen with strainers. The proposed revision to TS SR 3.5.2.9 is intended to reflect the revised terminology associated with the replacement of the existing sump screen with a strainer assembly.

On September 13, 2004, the NRC issued Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors," (ADAMS Accession No. ML042360586). The GL identified a potential susceptibility of recirculation flow paths and sump screens to debris blockage. GL 2004-02 requested that addressees perform an evaluation of the emergency core cooling system (ECCS) and containment spray system (CSS) recirculation functions in light of the information provided in the letter and, if appropriate, take additional actions to ensure system functionality.

The licensee has evaluated the containment recirculation sumps for adverse effects due to debris blockage of flow paths necessary for ECCS and CSS recirculation and containment drainage. That evaluation concluded that in order for the PNP design to meet the applicable regulatory requirements discussed in GL 2004-02 using the updated sump information, large sump strainers of a different design are required.

The licensee's supplements dated July 16 and September 20, 2007, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on June 19, 2007 (72 FR 33782).

2.0 REGULATORY EVALUATION

The licensee has proposed a change to TS SR 3.5.2.9, which covers the periodic inspection of the containment sump screen assembly relied upon by the ECCS and CSS for long-term functionality. The licensee's August 25, 2005 (ADAMS Accession No. ML052500280), response to GL 2004-02 describes the NRC's requirements regarding the long-term functionality of the ECCS and CSS that are applicable to PNP. The regulatory requirements pertinent to the proposed TS change are summarized below.

- Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Section 50.46(b)(5) "Long-term cooling," states: "After any calculated successful initial operation of the ECCS, the calculated core temperature shall be maintained at an acceptably low value and decay heat shall be removed for the extended period of time required by the long-lived radioactivity remaining in the core."

- General Design Criterion (GDC) 38 of Appendix A to 10 CFR 50, "Containment heat removal," states that a system to reduce the containment pressure and temperature following any loss-of-coolant accident (LOCA) and maintain them at acceptably low levels shall be provided.

- GDC 41 of Appendix A to 10 CFR 50, "Containment atmosphere clean-up," states that systems to control fission products, hydrogen, oxygen, and other substances which may be released into the reactor containment shall be provided as necessary to reduce the concentration and quality of fission products released to the environment following postulated accidents, and to control the concentration of hydrogen or oxygen and other substances in the containment atmosphere following postulated accidents to assure that containment integrity is maintained.

The basis for pressurized-water reactor (PWR) licensees to demonstrate compliance with the above requirements is documented in GL 2004-02. The primary purpose of GL 2004-02 was to request that PWR licensees evaluate the performance of their containment recirculation sumps and implement any modifications necessary to ensure compliance with applicable regulatory requirements on a mechanistic basis in light of the technical issues associated with Generic Safety Issue 191 (GSI-191), "Assessment of Debris Accumulation on PWR Sump Performance." GL 2004-02 requested that PWR licensees complete actions necessary for compliance with applicable regulatory requirements using the updated information associated with GSI-191 by December 31, 2007. Prior to this date, the NRC staff concluded in GL 2004-02 that licensees' compliance with their current licensing bases was sufficient to support continued plant operation.

This Safety Evaluation reviews the licensee's proposed TS change to ensure that consistency with the current licensing basis is maintained. Assurance that PWR licensees' proposed sump modifications are adequate in light of the technical issues associated with GSI-191 will be provided separately through the NRC staff's review of GL 2004-02 supplemental responses, through selected sample audit reviews of PWR licensees' sump performance calculations, and through reviews of standardized industry guidance and vendor practices.

3.0 TECHNICAL EVALUATION

3.1 Proposed TS Change

Currently, PNP TS SR 3.5.2.9 requires:

> Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet screens show no evidence of structural distress or abnormal corrosion.

The licensee has proposed the following revision to SR 3.5.2.9:

> Verify, by visual inspection, the containment sump passive strainer assemblies are not restricted by debris, and the containment sump passive strainer assemblies and other containment sump entrance pathways show no evidence of structural distress or abnormal corrosion.

The licensee indicated that the proposed revisions would not fundamentally alter the current inspection practice required by TS SR 3.5.2.9. Specifically, the licensee will continue to be required to visually inspect the containment sump suction inlet to verify that it is not restricted by debris and that its debris filters show no evidence of structural distress or abnormal corrosion.

In its supplemental letter dated July 16, 2007, the licensee clarified the scope of TS SR 3.5.2.9 in response to an NRC staff request for additional information. The licensee stated that Procedure RT-92, "Inspection of ECCS Train Containment Sump Suction Inlet," documents the steps for performing the required surveillance inspection. The licensee stated that the inspection procedure scope includes the passive strainer assemblies, floor drain debris screens, containment sump vent line debris screens, and reactor vessel cavity drain corium plug bottom cup assemblies. The licensee further stated that this procedure contains instructions to perform a cleanliness inspection of the containment sump, the sump level switches, and the containment sump drain. The licensee stated that these inspections ensure that foreign materials, including unidentified organic material that may develop on the sump interior, is removed. During a teleconference held on August 7, 2007, the licensee further confirmed that the inspection of the containment sump interior for debris and other foreign materials would continue to be a part of the required containment sump surveillance under the proposed revision to TS SR 3.5.2.9.

3.2 PNP Existing System and Design Description

The containment sump at PNP is a chamber located under the reactor cavity floor at a lower elevation than the containment base slab (590-foot elevation) to permit floor drain collection of system leakage within containment during normal plant operation and following a LOCA. The containment sump entrance pathways consist of containment sump downcomers, containment floor drains, containment sump vent lines, and reactor cavity drains.

There are 6 containment sump downcomers, which are located 2 inches above the containment floor at the 590-foot elevation. The downcomers provide a connection between the containment sump and the containment 590-foot elevation. The containment floor drains collect and transport system leakage via embedded drain lines to the containment sump. The containment sump vent lines assist in the release of air that may be collected at the top of the containment sump during LOCA flood up. The reactor cavity drain lines contain reactor cavity corium plugs. The reactor cavity corium plugs are designed to inhibit the flow of core debris (corium) into the containment sump. The containment sump exit pathways consist of two suction pipes that provide flow paths to the ECCS pumps. The ECCS pumps consist of low-pressure safety injection (LPSI) and high-pressure safety injection (HPSI). The LPSI pumps are not used during post-LOCA recirculation. Following an accident, during the recirculation mode of emergency core cooling, the sump supplies a suction source of water to the ECCS and CSS pumps with adequate net positive suction head (NPSH). The existing ECCS suction inlet screens, located in the sump, protect downstream components and systems from debris entrainment during recirculation from the sump.

In its supplemental letter dated July 16, 2007, the licensee provided a detailed description of the existing sump screens. The existing sump screens consist of two stainless steel screen assemblies, one for each ECCS containment sump suction. Each assembly has five panels. Each panel is approximately 37 inches high, 20 inches wide, and is fabricated from No. 6 stainless steel cloth mesh (0.047-inch-diameter wire mesh on 0.125-inch square center spacing). The screen mesh panels are mounted on structural angle frames extending from the floor of the sump to its ceiling, and they completely cover each of two ECCS/CSS pump suction lines. The size of the existing screen openings was based on restricting debris greater than 0.178 inch (on the diagonal of the square mesh) from entering the ECCS/CSS pump suction lines.

3.3 Description of New Strainer System for PNP

ENO's planned modification removes the existing ECCS suction inlet screens. In lieu of the ECCS suction inlet screens, ENO is planning to install passive strainer assemblies on the 590-foot elevation of containment. The passive strainer assemblies would connect to the containment sump via two containment sump downcomer pipes. These two containment sump downcomer pipes would provide the post-LOCA credited flow pathway from the passive strainer assemblies to the containment sump to provide a suction source of water to the ECCS and CSS pumps.

In addition to the passive strainer assemblies, debris screens are to be installed on the remaining open containment sump entrance pathways, which include the four remaining downcomer pipes, the seven containment floor drains, and the two containment sump vent lines. The reactor cavity corium plugs, located in the reactor cavity drain lines, contain pellets within the corium plug tube, tube end cap, and tube bottom cup support assembly, which form a debris interceptor similar in functionality to the debris screens. The strainer assemblies, together with the debris screens and the reactor cavity drain plugs, protect the common containment sump, rather than protecting only the ECCS/CSS pump suction lines. PNP housekeeping standards would be used to ensure that these containment sump entrance pathways are not restricted by debris. The proposed SR includes the performance of an inspection to ensure that these containment sump entrance pathways show no evidence of structural distress or abnormal corrosion. The licensee stated that including this requirement in the surveillance provides assurance that there would be no barrier breaches that would allow debris to enter the containment sump and cause downstream equipment damage.

In addition, as noted above in Section 3.1, TS SR 3.5.2.9 will continue to require that the licensee perform a cleanliness inspection of the containment sump, the sump level switches, and the containment sump drain. The licensee stated that this part of the required surveillance inspection will continue to ensure that (1) an adverse accumulation of organic material or residual debris particles from routine containment drainage would not occur and (2) debris intrusion into the sump via reverse flow due to a backup or misalignment in the dirty waste drain header would be detected.

3.4 Licensee Justification for Proposed TS Change

The licensee's submittal indicated that the proposed change to TS SR 3.5.2.9 provides a more appropriate description of the sump configuration after the installation of a larger strainer assembly is completed. The revised TS surveillance ensures that the debris generated during a large-break LOCA is prevented from entering the containment sump and that the sump continues to perform its specified safety function of supplying a suction source of water to the ECCS and CSS pumps, which provides adequate NPSH during recirculation.

In the July 16, 2007, supplemental letter, the licensee stated that the new strainers and new screens are designed to provide performance equivalent to, or better than, the existing screen for meeting the requirements of 10 CFR 50.46(b)(5) for long-term reactor core cooling, GDCs 38 and 41, and other existing licensing basis requirements for the sump. The effective area of each of the existing containment sump screens is approximately 26 ft^2 (for a total of approximately 52 ft^2 of total area in the sump). The effective surface area for the new containment sump strainer assemblies is approximately 3500 ft^2. This increase in surface area reduces the flow velocity through the screens and results in less debris head loss. Additionally, in conjunction with the reduced perforation size of 0.045 inch planned for the replacement strainer, the reduced strainer approach velocity will tend to limit the quantity of debris bypassing the strainer.

3.5 NRC Staff Evaluation

In determining the adequacy of the licensee's proposed TS change, the NRC staff's evaluation considered whether the planned replacement strainer assembly is capable of fulfilling the design functions of the existing screens under the current licensing basis. The containment sump design basis function is to provide the ability to recirculate primary coolant system water, following a LOCA, via the ECCS, HPSI and containment spray pumps. Under the current licensing basis, the PNP design demonstrates adequate sump functionality based on an assumption, from Regulatory Guide (RG) 1.82, Revision 0, that half of each of the existing sump screens is covered with debris such that water cannot flow through the blocked portion of the screen, while the other 50 percent is assumed to remain completely unblocked.

Based upon the information described above, the NRC staff considers the replacement strainer configuration as meeting the intent of the current sump performance licensing basis because the filtration capacity associated with the replacement strainers' large, complex surface is significantly in excess of the filtration capacity associated with the existing screen. Therefore, the NRC staff considers the replacement strainers to be functionally equivalent to (or better than) the existing screens under the non-mechanistic current licensing basis for satisfying the requirements of 10 CFR 50.46(b)(5) for long-term reactor core cooling.

The NRC staff also considered whether the planned replacement strainer evaluation has adequately considered potential dynamic effects of jet impingement, missile impact, and pipe whip. The NRC staff requested that the licensee provide additional information to ensure the structural integrity of the new passive strainer assemblies. In response to the NRC staff's request, the licensee provided a general arrangement drawing identifying the location of the strainer assemblies on the 590' containment elevation. The Engineering Change Package (EC496, Replace Containment Sump Screens Per GSI-191 Resolution (Passive Strainer)) identified that the location of the new strainer modules is outside of the missile shield walls and will not be subject to impingement from high-energy line breaks (HELB). The strainer assemblies are located in an area of the 590' elevation of containment where no HELB piping exists. The closest HELB location is on the elevation above the 607' elevation and is separated from the 590' elevation by a concrete floor. The strainer modules are such that a concrete wall or floor is between the HELB line and the modules. The strainer modules are located so that there is no "line of sight" through the 607' floor openings. Therefore, the effects of any missiles, high energy lines and the associated dynamic effects due to pipe whip and jet impingement on the modified strainer assemblies was considered as not credible. The NRC staff finds that the licensee adequately addressed the dynamic effects of jet impingement, missile impact, and pipe whip for the design of the new strainer assemblies.

In response to the NRC staff's questions regarding the codes utilized in the structural design of the sump replacement strainer, the licensee provided the following information. The sump replacement strainer pressure retaining components have been designed and analyzed to the standards of American National Standards Institute (ANSI) B31.1 Power Piping, 1973 Edition through summer 1973 Addenda, for the specified normal and accident conditions inside containment. The strainers are classified as "other pressure-retaining components" as described in Paragraph 104.7 of the ANSI B31.1 Code. Many of the strainer components are unique and ANSI B31.1 does not provide specific design guidance for these types of components. The American Society of Mechanical Engineers Boiler and Pressure Code (ASME Code), Section III, 1998 Edition is used for the qualification of pressure retaining parts of the strainer which are not covered in B31.1 (perforated plate, and internal wire stiffeners). Some parts of the strainers (external radial stiffeners, seismic stiffeners, tension rods, edge channels, etc.) are classified as part of the support structure. Structural support members are designed and fabricated to the standards of USA Standard B31.1 and the American Institute of Steel Construction, Inc. (AISC) Structural Steel Specification, Eighth Edition, 1980. Strainer Assembly angle iron support tracks were evaluated per AISC, 9th Edition. Additional guidance is also taken from other codes and standards where the AISC Code does not provide specific rules for certain aspects of the design. For instance, the strainers are made from stainless steel materials. The AISC Code does not specifically cover stainless steel materials. Therefore, ANSI/AISC N690-1994, "Specification for the Design, Fabrication, and Erection of Steel Safety Related Structures for Nuclear Facilities," was used to supplement the AISC in any areas related specifically to the structural qualification of stainless steel. Note that only the allowable stresses are used from this N690-1994 Code and load combinations and allowable stress factors for higher service level loads are not used. The strainer also has several components made from thin gage sheet steel, and cold formed stainless sheet steel. Therefore, Structural Engineering Institute/American Society of Civil Engineers 8-02, "Specification for the Design of Cold-Formed Stainless Steel Structural Members," was used for certain components where rules specific to thin gage and cold form stainless steel are applicable. The rules for Allowable Stress Design (ASD) as specified in Appendix D of this code were used. This was further supplemented by the AISI Code, 1996, "Specification for the Design of Cold-Formed Steel

Structural Members" where the ASCE Code is lacking specific guidance. Finally, guidance is also taken from American Welding Society D1.6, "Structural Welding Code - Stainless Steel," as it relates to the qualification of stainless steel welds. The NRC staff finds the codes utilized in the design of strainer assembly acceptable.

In response to NRC staff's request, the licensee provided the following information regarding the loads, and load combinations utilized in establishing the structural integrity of the sump replacement strainer assemblies and the discharge piping. The dead weight (DW) load includes the strainer weight and the force of full debris (DEB) loading. In the seismic analysis of the strainer assemblies, and the associated discharge piping, hydrodynamic forces were considered. The dynamic effects of surrounding water on the submerged strainer structure during an earthquake, i.e., added water mass, inertia coupling, impulse, sloshing, wave actions, damping, and participation of added water mass in the forcing term were considered. Two percent damping spectra (which are applicable to all elevations in the containment building) were used for the operating basis earthquake (OBE) load case and doubled for the design-basis earthquake (DBE) load case. A generic seismic sloshing analysis performed by the strainer vendor has concluded that the sloshing loads on the strainers are negligible. The strainers are essentially free standing structures and for the most part free to expand without restraint. Therefore, the thermal loads are negligible. A maximum differential pressure (DP) load of 7.25 feet of water column was applied in the structural analysis of the strainer assembly.

<u>Sump Strainers</u>

	Loading Conditions	Loading Combinations
(1a)	Normal Operating	DW +DEB + DP
(1b)	Normal Operating (outage/Lift Load)	DW + LL
(2)	Upset	DW + DEB + DP + OBE
(3)	Faulted	DW + DEB + DP + DBE

Where:

DW = Dead Weight
LL = Live Load (Additional Live loads acting on strainer assembly during outage and installation)
DP = Differential Pressure
DEB = Weight of Debris
OBE = Operating Basis Earthquake (2 percent damping seismic response spectra)
DBE = Design Basis Earthquake = 2 x OBE

<u>Strainer Discharge Piping</u>

	Loading Conditions	Loading Combinations
(1a)	Hoop Stresses	DP
(1b)	Normal (pressure + Sustained)	P + DW
(2)	Upset	P + DW + OBE
(3)	Faulted	P + DW + SSE
(4)	Secondary	T1

Where:

DP = Design Pressure Hoop Stress
P = Differential Pressure
OBE = Operating Basis Earthquake
ASME Code Case N-411 method is employed.
SSE = Safe Shutdown Earthquake = 2 x OBE
T1 = Thermal Expansion (maximum sump water temperature of 264 degrees F)

Strainer Discharge Pipe Support Structural Components

Loading Conditions	Loading Combinations
Normal	DW + T1
Upset	DW + OBE + T1
Faulted	DW + SSE + T1

Where:

DW = Dead Weight Load
OBE = Operating Basis Earthquake
SSE = Safe Shutdown Earthquake
T1 = Thermal Expansion

The NRC staff finds that the load combinations follow the guidelines of RG 1.82.

The strainers and their supporting elements are required to meet Category I Seismic Criteria in order to perform their intended safety function after an accident. The strainers are designed to withstand the hydrodynamic loads and inertial effects of water in the containment basement, at full debris loading, without loss of structural integrity during a design basis seismic event. The design conditions for the strainer modules, as defined in the strainer procurement specification, include the live load, DP loads, thermal loading, and seismic events (OBE and DBE).

The specific condition considered is a DBE during which an SSE occurs while the strainer is in a submerged condition after a LOCA. The ability of the strainers to perform their safety functions during and/or after an OBE and SSE has been demonstrated in the seismic analysis report for Palisades which concludes that:

- The strainer assemblies are designed to the loadings of DW, pressure, thermal, seismic and seismic sloshing, without loss of structural integrity.

- A maximum analytical DP load of 7.25 feet water column was applied in the structural analyses.

To ensure adequate NPSH to the containment spray pumps, a maximum permissible total head loss for the strainer assembly with its form debris bed was limited to 6.52 feet, whereas the structural capability of the strainer is 7.25 feet.

The seismic analysis report for the replacement sump strainers stated that the strainers have been analyzed, as required, for the specified normal and accident conditions inside containment, and the strainer meets all the acceptance criteria for all applicable loadings. The seismic analysis report for the strainer discharge piping and supports has shown that the pipe stresses and support loads are acceptable. The piping stresses, flanges, and support component stresses are within their respective applicable limits and are, therefore, acceptable. Stresses were calculated in the strainer and strainer discharge piping seismic analysis reports. By comparing the calculated stresses to the allowable stresses, the margin for each strainer component was determined. Most components were determined to have significant margin, and every analyzed strainer component was determined to be within its allowable stress limits.

Consistent with the intent of GL 2004-02, the current licensing basis compliance is sufficient until December 31, 2007. No later than this date, the NRC staff has requested that licensees complete modifications to their licensing bases for containment recirculation sump performance to ensure consistency with the mechanistic methodology associated with GSI-191. Assurance that the licensee's replacement strainer design is adequate for satisfying the intent of GL 2004-02 will be provided by the NRC staff's regulatory activities regarding GL 2004-02 and GSI-191, including reviews of licensees' supplemental responses to GL 2004-02, sample audits of licensees' sump performance calculations, and reviews of generic industry guidance and practices. Therefore, the NRC staff considers the licensee's proposed TS SR change to be acceptable.

4.0 SUMMARY

The NRC staff has reviewed the licensee's proposed revision to TS SR 3.5.2.9 of the PNP TS. As described above, the proposed revision would clarify terminology associated with the replacement strainers and sump configuration. The licensee will continue to be required to visually inspect the containment sump suction inlet with an 18-month frequency to verify that it is not restricted by debris and that its debris filters show no evidence of structural distress or abnormal corrosion. The NRC staff determined that, under the current licensing basis, the planned replacement strainers are functionally equivalent to (or better than) the existing screens for satisfying 10 CFR 50.46(b)(5) for long-term reactor core cooling. Based upon a review of the input from the licensee regarding the pipe whip, jet impingement, missile impact, loads, load combinations, applicable evaluation codes, and margins, the NRC staff concludes that the replacement sump strainer assemblies are structurally adequate. In addition, the NRC staff noted that generic review activities associated with GL 2004-02 will provide assurance that PWR licensees' replacement strainer designs are adequate to satisfy applicable regulatory requirements in accordance with the mechanistic criteria associated with GSI-191. Based upon these findings, the NRC staff concludes that the proposed revision to TS SR 3.5.2.9 is acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Michigan State official was notified of the proposed issuance of the amendment. The Michigan State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (72 FR 33782). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: R. Reyes
C. Basavaraju
J. Lehning

Date: October 4, 2007

Palisades Plant

cc:

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

Mr. Michael R. Kansler
President & CEO/CNO
Entergy Nuclear Operations
1340 Echelon Parkway
Jackson, MS 39213

Mr. John T. Herron
Sr. Vice President
Entergy Nuclear Operations
1340 Echelon Parkway
Jackson, MS 39213

Sr. Vice President,
Engineering and Technical Services Entergy
Nuclear Operations, Inc.
1340 Echelon Parkway
Jackson, MS 39213

Mr. Christopher J. Schwarz
Site Vice President
Entergy Nuclear Operations
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

General Manager, Plant Operations
Entergy Nuclear Operations
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

Mr. Oscar Limpias
Vice President, Engineering
Entergy Nuclear Operations
1340 Echelon Parkway
Jackson, MS 39213

Mr. John F. McCann
Director, Nuclear Safety & Licensing
Entergy Nuclear Operations
440 Hamilton Avenue
White Plains, NY 10601

Ms. Charlene D. Faison
Manager, Licensing
Entergy Nuclear Operations
440 Hamilton Avenue
White Plains, NY 10601

Mr. Ernest J. Harkness
Director, Oversight
Entergy Nuclear Operations
1340 Echelon Parkway
Jackson, MS 39213

Mr. William C. Dennis
Assistant General Counsel
Entergy Nuclear Operations
440 Hamilton Avenue
White Plains, NY 10601

Mr. Joseph P. DeRoy
VP, Operations Support
Entergy Nuclear Operations, Inc.
1340 Echelon Parkway
Jackson, MS 39213

Ms. Laurie A. Lahti
Manager, Licensing
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

Mr. John A. Ventosa
GM, Engineering
Entergy Nuclear Operations
440 Hamilton Avenue
White Plains, NY 10601

Director, NSA
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

Mr. William DiProfio
48 Bear Hill Road
Newton, NH 03858

Mr. William T. Russell
400 Plantation Lane
Stevensville, MD 21666

Mr. Gary Randolph
1750 Ben Franklin Drive, 7E
Sarasota, FL 34246