UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

October 7, 2009

Mr. Christopher J. Schwarz
Vice President, Operations
Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: NOTICE OF ENFORCEMENT DISCRETION FOR ENTERGY NUCLEAR OPERATIONS, INC., REGARDING PALISADES NUCLEAR PLANT (NOED NO. 09-3-002; TAC NO. ME2303)

Dear Mr. Schwarz:

By letter dated October 5, 2009, and clarified by your addendum dated October 6, 2009, you requested that the U.S. Nuclear Regulatory Commission (NRC) staff exercise discretion to not enforce compliance with the actions required in Technical Specification (TS) 3.7.8, "Service Water System (SWS)." Your letter documented information previously discussed with the NRC staff in a telephone conference on October 1, 2009, at 3:00 p.m. (All times discussed in this letter refer to Eastern Daylight Time). You stated that on October 2, 2009, at 9:08 a.m., Palisades would not be in compliance with TS 3.7.8 Required Action A.1, which would require Palisades to enter Required Action B.1 and B.2 to place the unit in Mode 3 (Hot Standby) within 6 hours and in Mode 5 (Cold Shutdown) within 36 hours, respectively. You requested that a Notice of Enforcement Discretion (NOED) be granted pursuant to the NRC's policy regarding exercise of discretion for an operating facility, set out in Section VII.C, of the "General Statement of Policy and Procedures for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600, and be effective for the period from 9:08 a.m. on October 2, 2009, to 9:08 a.m. on October 3, 2009. This letter documents our telephone conversation on October 1, 2009, when we orally issued this NOED at 7:00 p.m. We understand that the condition causing the need for this NOED was corrected by you, allowing you to exit from TS 3.7.8 Required Action A.1 at 8:22 a.m. on October 2, 2009. Therefore, the additional time granted by the NOED was not needed.

The principal NRC staff members who participated in that telephone conference included: Steven West, Director, Division of Reactor Projects (DRP), Region III (RIII); Gary Shear, Deputy Director, DRP, RIII; Kenneth O'Brien, Deputy Director, Division of Reactor Safety (DRS), RIII; Allen Howe, Deputy Director, Division of Operating Reactor Licensing, Office of Nuclear Reactor Regulation (NRR); Greg Casto, Branch Chief, NRR; David Hills, Branch Chief, DRS, RIII; Jack Giessner, Branch Chief, DRP, RIII; Julio Lara, Team Leader, DRP, RIII; Robert Hardies, Senior Level Advisor for Materials Engineering, NRR; Gerard Purciarello, Senior Reactor Systems Engineer, NRR; Steve Tingen, Senior Mechanical Engineer, NRR; Jeff Circle, Senior Reliability/Risk Analyst, NRR; Mahesh Chawla, Project Manager, NRR; Patricia Lougheed,

Senior Enforcement Coordinator, RIII; Laura Kozak, Senior Reactor Analyst, RIII; Nicholas Valos, Senior Reactor Analyst, RIII; Robert Lerch, Project Engineer, DRP, RIII; Melvin Holmberg, Reactor Inspector, DRS, RIII; John Ellegood, Senior Resident Inspector, Palisades; Thomas Taylor, Resident Inspector, Palisades; Frank Tran, Reactor Engineer, DRP, RIII; Matthew Hamm, Reactor Systems Engineer, NRR; Sheldon Stuchell, Sr. Project Manager, NRR.

At 9:00 a.m. on September 29, 2009, with the plant operating at approximately 100 percent power and with service water (SW) pumps P-7A and P-7C in service, you received alarms in the control room for low service water header pressure and indication that standby SW pump P-7B auto started. After initial investigation, you found all three SW pumps running, the discharge pressure of P-7C at 0 psig, and significant vibration of the packing shaft for SW pump P-7C. You immediately secured SW pump P-7C and declared it inoperable. The plant entered TS 3.7.8 Condition A at 09:08 a.m. on September 29, 2009.

Technical Specification Limiting Condition for Operation 3.7.8, "Service Water System (SWS)," states that "Two SWS trains shall be operable." This specification is applicable in MODES 1, 2, 3, and 4. Technical Specification 3.7.8 Condition A provides required actions for one or more SWS trains inoperable. Required Action A.1 requires "Restore train(s) to OPERABLE status" within 72 hours. On October 1, you re-evaluated your plans and schedule and you believed that Palisades would not be able to complete Required Action A.1 within the specified Completion Time of 72 hours. If the Completion Time of Required Action A.1 cannot be met, Condition B applies and requires the unit be placed in Mode 3 (Hot Standby) within 6 hours and in Mode 5 (Cold Shutdown) within 36 hours. Therefore, on October 1, 2009, your staff requested enforcement discretion to preclude a required entry into Mode 3 (Hot Standby). To accomplish this, you requested that the 72-hour completion time for TS 3.7.8 Required Action A.1 be extended for 24 hours to complete repairs and post maintenance testing of SW pump P-7C. With the extension, the unit would have been required to enter Condition B of TS 3.7.8 at 9:08 a.m. on October 3 and be in Mode 3 in 6 hours if SW pump P-7C remained inoperable.

After inspecting SW pump P-7C, you identified that the packing gland nuts were not in place on the studs for the packing gland follower, there was damage to the packing shaft above the packing follower, and the coupling between the packing shaft and the top line shaft was broken into two pieces. Upon further investigation, you found that the improper heat treatment of the coupling was the cause of the failure. The material of the coupling is 416 stainless steel heat-treated to a specified 28 to 32 Rockwell Hardness (Rc). According to ASTM Standard A582/A 582M – 95b, "Standard Specification for Free-Machining Stainless Steel Bar," the hardness of material should be between 24 to 32 Rc for an intermediate temper condition. However, the hardness of the failed coupling was found to be 37 Rc throughout the material which caused the material to be susceptible to brittle failure. Based on your testing and evaluation, you stated that the catastrophic failure of the coupling was most likely due to brittle fracture in an overload condition for that material. The overload was most likely caused by the stopping and starting of the pump.

Based on your review of the condition, your staff determined that the issue was limited to the couplings of SW pump P-7C. In discussions with members of your staff, your staff stated that SW pump P-7B couplings were made of different material (carbon steel) compared to SW pump P-7C couplings (stainless steel). The couplings of SW pump P-7A (stainless steel) were heat treated at the same vendor but one year earlier than the SW pump P-7C couplings. In addition, while some of the P-7C couplings required additional heat treatment, the records for P-7A couplings indicate they successfully passed hardness testing following the first heat treatment. According to your staff, SW pumps P-7A and P-7B are in service and show no abnormal indications. Therefore, your staff concluded that there were no concerns with the performance of these two pumps.

Your staff requested this NOED after consideration of the safety significance and potential consequences of extending the completion time. Your staff performed a bounding risk assessment of extension of the completion time for 24 hours. Your staff concluded that extension of the completion time would result in no net increase in radiological risk to the public.

Using the zero maintenance probabilistic risk assessment (PRA) model, your staff estimated the incremental conditional core damage probability (ICCDP) to be 8.16E-8 and the incremental conditional large early release probability (ICLERP) to be 7.7E-12. These are less than the thresholds of 5E-7 and 5E-8, respectively, specified in Regulatory Issue Summary (RIS) 2005-01. The NRC staff reviewed your risk estimate and determined that it was significantly influenced by the loss of service water initiating event frequency as a result of the failure of P-7C SW pump. However, the NRC staff concluded that even using a higher increase in initiating event frequency would result in an acceptable increase in ICCDP and ICLERP for the proposed 24-hour period of the enforcement discretion period. After independently calculating ICCDP and ICLERP, assuming that there were no concerns with the performance of SW pumps P-7A and P-7B, the NRC staff determined they were below the thresholds in RIS 2005-01, "Changes to Notice of Enforcement Discretion (NOED) Process and Staff Guidance." These calculated risk increases are consistent with the site's normal work control levels; therefore, there is no net increase in radiological risk to the public.

On October 1, 2009, you provided the NRC staff with an Onsite Safety Review Committee-approved proposal for an NOED. Subsequent to the NRC staff's review of your proposal, you discussed the request with members of the NRC and provided additional information and proposed compensatory measures. Based on the proposal and additional information and commitments, the NRC staff approved your request. On October 5, 2009, you provided the NRC staff with a written request that incorporated the items discussed during the October 1, 2009, teleconference that provided the basis for the NRC's decision to grant the NOED.

As for compensatory measures, during the time the NOED was in effect, your staff committed to the following:

1) No non-essential work would be allowed that could potentially jeopardize stable plant operation.

2) Palisades would have designated the following equipment as “Protected Equipment” and would control the protected equipment in accordance with the applicable procedure during the extended TS action completion time:

- SW pump P-7A,
- SW pump P-7B,
- electric fire water pump P-9A,
- diesel fire water pump P-9B,
- diesel fire water pump P-41,
- containment spray pumps P-54B and C,
- emergency diesel generator 1-1 ,
- component cooling water pump P-52A,
- component cooling water pump P-52B,
- 2400 VAC safeguards bus 1C,
- auxiliary feedwater pumps P-8A and B,
- screen wash pump P-4,
- traveling screens F-4B and C,
- traveling screens control panel,
- supplemental emergency diesel generator 1-3,
- Safeguards bus room,
- traveling screen F-4C breaker 52-563,
- traveling screen F-4B breaker 52-561,
- screen wash pump P-4 breaker 52-1406, and
- switchyard.

3) Palisades would conduct hourly monitoring of the critical service water header pressure, service water pump amperage, and lake (ultimate heat sink) temperature.

4) Palisades was monitoring the following components every 2 hours:

a. service water pump P-7A and B,
b. traveling screens F-4B and C,
c. screen wash pump P-4,
d. fire water pumps P-9A and B,
e. diesel fire water pump P-41, and
f. SW pumps P-7A and B basket strainer differential pressure.

5) The plant operations crews had been briefed on these risk management measures.

6) Guidance was developed for cycling SW pump P-7A in the event of increasing basket strainer differential pressure to reduce this pressure.

7) Operators had been briefed on a loss of service water (Off Normal Procedure 6.1, “Loss of Service Water”).

8) Operators had been briefed on service water leak and increased flow scenarios.

9) Fire tours had been established in the screen house and the 1C switchgear room.

The resident inspector verified that the above items were implemented.

The NRC staff reviewed your written request for enforcement discretion and verified consistency between your oral and written requests. The NRC staff's basis for this discretion considered: (1) the compensatory measures to reduce the probability of a loss of equipment important due to its presence in high risk cut sets, (2) quantitative risk evaluation of the continued operation with the SW pump P-7C inoperable, (3) the qualitative risk evaluation of the condition with your compensatory measures in place, (4) your actions to correct the deficiency, and (5) your statement that other SW pumps were not affected by the deficiency. The NRC staff determined that the risk of continued operation with compensatory measures for an additional 24 hour period did not result in an increased risk over shutting down the unit.

In our review of your letter requesting enforcement discretion, we noted that you stated the pump shaft and couplings of SW pump P-7B were made of carbon steel and are not subject to the same failure mode as SW pump P-7C coupling. In your addendum dated October 6, you clarified that the coupling is carbon steel, but the shaft was stainless steel. This did not change the results of our conclusion: pump P-7B was not subject to the same failure mode. In addition, in your written request you stated that the new couplings which were installed for SW pump P-7C were independently tested prior to installation. Subsequently, you informed the NRC that all the replacement couplings may not have had independent hardness testing performed prior to installation. The NRC will review this information during follow-up inspections at the site.

Based on the above considerations, the NRC staff concluded that Criterion B.2.1.1.a and the applicable criteria in Section D.4 to NRC Manual Chapter 9900, "Technical Guidance, Operations - Notice of Enforcement Discretion," were met. Criterion B.2.1.1.a states that for an operating plant, the NOED is intended to avoid unnecessary transients as a result of compliance with the license condition and, thus, minimize potential safety consequences and operational risks. On the basis of the staff's evaluation of your request, the NRC staff has concluded that granting this NOED is consistent with the Enforcement Policy and staff guidance, and has no adverse impact on public health and safety or the environment. In your addendum dated October 6, you explained the reasons you did not need to use the additional 24 hour time period. Your staff completed repairs and testing on the P-7C pump inside of the original completion time of 72 hours; therefore, the enforcement discretion granted was not needed.

In addition as discussed on October 1, 2009, the NRC staff agrees with the licensee's determination that a follow up TS amendment is not necessary. The NRC staff finds that a TS amendment (either a temporary or permanent) needed for circumstances similar to those addressed by the NOED is not necessary because it involves a non-recurring noncompliance and only involves a single request for extending the TS allowed outage time for an inoperable component.

As stated in the Enforcement Policy, action will be taken, to the extent that violations were involved, for the root cause that led to this NOED.

Sincerely,

/RA by G. Shear Acting for/

Steven West, Director
Division of Reactor Projects

Docket No. 50-255; 72-007
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