

February 22, 2007

MEMORANDUM TO: Mark A. Satorius, Director
Division of Reactor Projects, Region III

FROM: Timothy J. McGinty, Deputy Director /RA/
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: RESPONSE TO TASK INTERFACE AGREEMENT (TIA)
2006-004, "REQUEST FOR TECHNICAL ASSISTANCE - IMPACT OF
HEAT EXCHANGER OUT-OF-SERVICE ON SHUTDOWN COOLING
SYSTEM TRAINS AT PALISADES" (TAC NO. MD2720)

By letter dated July 28, 2006, Region III submitted Task Interface Agreement (TIA) 2006-004, "Request for Technical Assistance - Impact of Heat Exchanger Out-of-Service on Shutdown Cooling System Trains at Palisades." Near the end of the recent refueling outage at Palisades, the licensee scheduled repair work on a valve that initiates flow from the outlet of shutdown cooling heat exchangers (SDCHXs) to the suction of high-pressure safety injection (a post-accident recirculation mode of operation). At this point in the outage, the reactor refueling cavity had been drained so it was at less than the 647 foot elevation level referenced in the Technical Specifications (TSs). Although two trains of shutdown cooling are required in this configuration, the valve repair necessitated isolation of one SDCHX. Thus, the licensee had two pumps, but only one SDCHX available despite the TS requirement for two trains of shutdown cooling. Region III requested Nuclear Reactor Regulation (NRR) assistance to resolve the following questions related to shutdown cooling system (SDC) train operability when only one of two SDCHXs is available:

1. Does TS 3.9.5 require a distinct pump and distinct heat exchanger for each train of SDC?
2. In the event that the answer to the first question is no (i.e., one heat exchanger could be a component of multiple SDC trains) is the attached 10 CFR 50.59 screening correct and adequate for the TS Bases revision that was made?

NRR's Division of Safety Systems, Balance-of-Plant Branch (SBPB) has completed its review of the assigned task, with concurrence from the Technical Specification Branch in the Division of Inspection and Regional Support to assure that SBPB position is consistent with and does not conflict with previous TS interpretations that have been issued. The NRR staff

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response to Question 1 of the TIA is enclosed. Since a distinct pump and a distinct heat exchanger are required for each operable shutdown cooling train, the NRR staff has determined that a response to Question 2 of the TIA is not required.

Docket No. 50-255

Enclosure:

As stated

cc: C. Lipa, Region III
J. Ellegood, Region III
J. Giessner, Region III

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STAFF ASSESSMENT BY THE OFFICE OF NRR
FOR TASK INTERFACE AGREEMENT
RELATED TO SHUTDOWN COOLING HEAT EXCHANGERS
AT PALISADES NUCLEAR PLANT
DOCKET NO. 50-255

1.0 INTRODUCTION

In a memorandum dated July 28, 2006, Region III submitted Task Interface Agreement (TIA) 2006-004, "Request for Technical Assistance - Impact of Heat Exchanger Out-of-Service on Shutdown Cooling System Trains at Palisades." The TIA requested Nuclear Reactor Regulation (NRR) assistance in clarifying the Technical Specification (TS) operability requirements for the shutdown cooling heat exchangers (SDCHXs) at the Palisades plant and, depending on the clarification, NRR was asked to determine if the 10 CFR 50.59 screening that was completed by the licensee for changing the TS Bases was appropriate.

2.0 BACKGROUND

Near the end of a recent refueling outage at Palisades Nuclear Plant, the licensee completed repair work on a valve that required one of the SDCHXs to be isolated. During the repair period, the refueling cavity was drained to less than the 647 feet elevation. Palisades TS 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation - Low Water Level," requires two SDC trains to be operable with one train in operation during refueling operations when the refueling cavity water level is less than the 647 feet elevation. Thus, while valve repairs were being completed, one of the two SDCHXs was inoperable, and Region III questioned the licensee about how TS 3.9.5 was being satisfied. The licensee indicated that the plant licensing basis allowed for only one SDCHX to serve both SDC trains, because it is a passive device and it is not subject to any active failures while it is aligned for service. The Region questioned the licensee's logic and has requested NRR assistance in resolving the following questions related to SDC system train operability when only one of the two SDCHXs is available:

1. Does TS 3.9.5 require a distinct pump and distinct heat exchanger for each train of SDC?
2. In the event that the answer to the first question is no (i.e., one heat exchanger could be a component of multiple SDC trains) is the attached 10 CFR 50.59 screening correct and adequate for the TS Bases revision that was made?

2.0 Balance-of-Plant Branch Response to Question 1 of TIA 2006-004

The evaluation focuses on the development of Palisades TS 3.9.5 and what is meant by the "Train" designation relative to SDC system component operability requirements.

The licensee has converted the TSs for Palisades to the Improved Technical Specifications (ITSs) and, absent any plant-specific considerations that may have been allowed for implementing the ITS conversion, the standard interpretation of TS 3.9.5 is that two completely separate and independent trains of SDC are required. This would include separate pumps,

ENCLOSURE

heat exchangers, and fluid flow paths for each train. However, in order to determine to what extent this ITS interpretation applies to Palisades, the plant licensing basis as reflected in the Palisades Updated Final Safety Analysis Report (UFSAR) and the development and Bases of the current, as well as the previous, Palisades TS requirements must be reviewed.

Section 6.1.2.1 of the Palisades UFSAR indicates that when the refueling cavity-water level is greater than or equal to the 647 feet elevation, it can provide decay heat removal capability in the event that one train of SDC is inoperable. The UFSAR also states that the SDCHXs, operating together, are sized to hold the refueling temperature with the design component cooling water temperature of 90 degrees F. Therefore, the plant design basis as reflected in the UFSAR tends to support the position that both SDCHXs are required to be operable when the refueling cavity-water level is less than the 647 feet elevation. At elevations greater than 647 feet, the refueling cavity is capable of providing adequate cooling and may be credited in place of one of the SDC trains.

The need for TS requirements for the SDC system was established by Generic Letter (GL) 88-17, "Loss of Decay Heat Removal." The licensee's 90-day response to this GL dated January 31, 1989, indicated that a TS change request would be submitted to add appropriate requirements for decay heat removal. Also, in order to assure that adequate equipment would be available to maintain cooling of the primary coolant system (PCS) and to avoid a loss of the SDC system, the licensee stated that administrative controls were implemented that required (among other things) both of the SDCHXs to be operable. Therefore, the plant licensing basis as established by the licensee's response to GL 88-17 relied upon both SDCHXs to be operable for assuring adequate decay heat removal during shutdown and reduced PCS inventory conditions.

As requested by GL 88-17, the licensee proposed TS requirements for the SDC system in a License Amendment Request (LAR) dated June 28, 1989. The licensee's request, as modified by several supplements to the original application, was approved by issuance of Amendment No. 161 dated August 12, 1994, and established TS 3.1.9, "Shutdown Cooling (SDC)." TS 3.1.9.3 was applicable during refueling outages when there was fuel in the reactor, the PCS temperature was less than 200 degrees F, and the PCS loops were not filled. When in this condition, TS 3.1.9.3 required SDC Train A and Train B to be operable, each with an operable SDC pump and an operable heat flow path to Lake Michigan. A supplement to the LAR dated August 28, 1992, clarified that the "Train" designator at Palisades referred to the redundant parts of safety systems such as SDC or safety injection. As discussed in the Bases for TS 3.1.9, a heat flow path required (among other things) an SDCHX. The TS Bases recognized that the SDC trains at Palisades are not totally independent since they share common suction and discharge piping including valves MO-3015, MO-3016, CV-3006, CV-3025, and CV-3055; but no mention was made of sharing a common SDCHX. Therefore, TS 3.1.9.3 required the two redundant SDCHXs to be operable, one for each train. This is consistent with the administrative controls that were originally implemented in response to GL 88-17, which relied upon both SDCHXs to be operable, and NRC approval of TS 3.1.9 by Amendment No. 161 did not change the plant licensing basis in this regard.

The custom TS requirements for the Palisades plant were converted to the ITSs by issuance of Amendment No. 189 dated November 30, 1999. The SDC requirements that were initially specified by TS 3.1.9.3 were converted to TS 3.9.4 and TS 3.9.5, which specify SDC requirements for refueling operations. TS 3.9.5 applies when the refueling cavity-water level is

less than the 647 feet elevation. The conversion to TS 3.9.5 is of interest because this TS is the subject of TIA 2006-004. The licensee indicated that in converting from TS 3.1.9.3 to TS 3.9.5, the details associated with SDC train operability (i.e., the listing of what components and features constitute a train) were relocated to the Bases Section of TS 3.9.5. Thus, the conversion relocated administrative details to the TS Bases consistent with the ITS format, but it did not change the requirement for redundant parts of the SDC system to be operable for each SDC train as originally specified by TS 3.1.9.3 and consistent with the response that was provided to GL 88-17.

Similar to TS 3.9.5, there are other TS requirements that also specify SDC system operability requirements for the Palisades plant. Of particular interest in this regard is TS 3.4.8, "PCS Loops - Mode 5, Loops Not Filled," which specifies SDC system requirements during Mode 5 operation at reduced PCS inventory conditions (such as during mid-loop operation). Like TS 3.9.5, two SDC trains are required to be operable for this situation. The intent of TS 3.4.8 as specified in the TS Bases is in part to "require that two paths be available to provide redundancy for heat removal." Allowing a single SDCHX to serve both trains of the SDC system does not provide two paths for redundancy of heat removal and is not consistent with the "Train" concept that was established by the licensee for the Palisades plant. It is also not consistent with the licensee's response to GL 88-17 relative to reduced PCS inventory operations. Therefore, in order to satisfy TS 3.4.8 requirements, a separate SDCHX must be OPERABLE for each SDC train; each one providing a redundant path for heat removal. Because it unnecessarily complicates TSs for an SDC train to have one meaning for one TS and a different meaning for another TS, it follows that this concept of an SDC train applies regardless of whether the requirement is specified by TS 3.4.8, TS 3.9.5, or any other TS that requires two trains of SDC to be operable.

Based on a review of the plant design basis as reflected in the UFSAR, a review of the requirements specified by TS 3.9.5 (including consideration of the licensee's response to GL 88-17, the subsequent development of SDC system TS requirements, and the conversion to ITSs), and consideration of other Palisades TSs that require two SDC trains to be operable, NRR has determined that each train of the SDC system consists of redundant parts of the system (to the extent that redundancy is provided by the SDC system design) and those common parts that are necessary to satisfy the SDC function. Therefore, the response to Question 1 of the TIA is yes, TS 3.9.5 requires a distinct pump and a distinct heat exchanger for each train of the SDC system.