



March 20, 2015

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

Subject: Report of NCNR Violation of Limiting Conditions of Operation

Ref: NRC Event Report, 50871, Docket 50-184, Facility License TR-5

Sir:

On Saturday, March 7, 2015, at 0830 EST, the NCNR (NIST Center for Neutron Research) discovered a probable violation of the Limiting Condition for Operations (LCO) of the TR-5 Technical Specifications (TS), 3.3.2, Specification(1), while performing maintenance during a scheduled reactor shutdown period.

The initial report was made to the NRC Operations Center in accordance with 10 CFR 50.36 and TR-5 TS 6.7.2.d. on March 7, 2015. The recorded Incident report time was 1654 EST.

The TS is as follows:

TS 3.3.2 Emergency Core Cooling
 Specification

The reactor shall not be operated unless:

- (1) The D₂O emergency core cooling system is operable.
- (2) A source of makeup water to the D₂O emergency cooling tank is available.

Circumstances of the Violation

During routine maintenance on the hot waste pump motor contactors it was discovered that the local disconnect switch for both the hot waste sump pump and the adjacent emergency sump pump were in the disconnect position. The last time that the emergency sump pump was verified to be operable was on July 2, 2014, when the annual surveillance of operability of this pump was performed in accordance with Technical Specifications Procedure (TSP) 4.3.2(2) (Operability of the Emergency Sump Pump with Water). The operability of the hot waste sump pump is not an LCO, however, it is used in the performance of TSP 4.3.2(2). There was no maintenance performed on the emergency sump pump during the present scheduled reactor shutdown period that would have required the lockout to be placed in the disconnect position, nor is there any other

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known reason that the switch would have been placed in the disconnect position since July 2, 2014. The fact that the disconnect switches of these two sump pumps are used in the performance of TSP 4.3.2(2) lends credence to the assumption that the mis-positioning of the switches took place on July 2, 2014. Further support to this assumption is given by the fact that the room in which the lockout switches are located is subject to strictly controlled access. Only personnel given explicit permission by the Reviewing Official have access without an escort.

In the event of a loss of core coolant, the emergency core cooling system provides sufficient D₂O, to passively provide adequate coolant for ~ 2.5 hours to cool the fuel and protect against the release of fission products. That part of the emergency core cooling system was and remains operable and is not part of this violation.

The emergency core cooling system employs the emergency sump pump to return spilled coolant to the emergency cooling tank. There is only enough D₂O in the inner reserve tank and the emergency cooling tank to provide cooling for 2.5 hours on a once through basis. Because there is only one sump pump, it must be operational whenever the reactor is operated (TS 3.3.2 (1)). In the event that that pump fails or is inoperable and the D₂O supply in the emergency cooling tank is exhausted, domestic water or a suitable alternative would be used to furnish water for once through cooling (TS 3.3.2 (2)). Therefore, a source of makeup water to the D₂O emergency cooling tank was and remains available and is not part of this violation.

The violation that is the subject of this report is that the sump pump was discovered inoperable and may have been inoperable since July 2, 2014, which includes periods of reactor operation. That is a violation of TS 3.3.2 (1).

After the discovery the sump pump disconnect switch was immediately placed in the connect position.

Analysis

Upon investigation it has been determined that the operation of the lockout switch is not intuitive. The Human Machine Interface (HMI) of the lockout switch of the sump pump is of a design that is different from lockout switches in the rest of the plant. The switch design is that of a push button which is locked by a bezel, which in turn is locked by a latch. An operator can easily be confused into believing that removing the latch is sufficient to switch the lockout to the connect position, where in reality the bezel needs to be rotated in addition to removing the latch in order for the spring loaded button to be released to allow the disconnect to be in connect position.

The only time the lockout switch on this sump pump is being used is during the execution of the TSP 4.3.2 (2) surveillance procedure. The lockout switch is used as a temporary

means to operate the pump, which allows the reactor operator performing the surveillance to better control the work. Since the operators work rotating shifts, the interval between times that any one operator will use the switch maybe many years. In order to address this, the NCNR will implement the following remedy:

Remedy 1: The NCNR will immediately train all operators in the proper use of the lockout switch in question. Furthermore, the NCNR will augment its requalification training program such that all operators will be specifically trained on the use of this lockout switch at least every 2 years.

The last step of the TSP 4.3.2 (2) surveillance procedure under which the July 2, 2014 surveillance was carried out calls for the disconnect switch to be placed in the connect position. Upon completion of this step the reactor operator performing the procedure initials the procedure indicating that the procedure has been completed correctly. As such the procedure has an inherent weakness in that it does not call for a check of the operability of the pump. Specifically, if the disconnect switch was thought to have been placed in the connect position, but in reality was left in the disconnect position, which could presumably happen due to the analysis given above Remedy 1, there would be no way to discover that, leading to a potential for the present violation to recur. As a remedy the NCNR will implement the following remedy:

Remedy 2: The NCNR will change the procedure such that the sump pump is observed to be running at which point the power to the pump is cut by operating the pump switch in the control room. This guarantees that the disconnect switch is in the connect position at the end of TSP 4.3.2 (2) amended as such.

The present violation concerns an LCO, in other words: the reactor shall not be operated unless the condition that the sump pump is operational is met. In addition to executing TSP 4.3.2 (2) on a yearly basis as called for in the TS (and is done now) the NCNR will add the following item to its pre-startup checklist.

Remedy 3: A visual verification of the status of the sump pump lockout switch will be added to the pre-startup checklist. This verification will not be done by attempting to operate the switch. The training specified in Remedy 1 will address the means by which the visual verification must be performed.

Root Cause

As pointed out in the analysis preceding Remedy 2 our present TSP 4.3.2 (2) procedure allows for the disconnect switch to be inadvertently left in the disconnect position and as such would go unnoticed. Unrelated to this violation, the NCNR is currently undertaking an in-depth review of the all its procedures. In order to facilitate that review all NCNR

procedures have been entered into a format that allows them to be edited in a much more efficient way than was the case heretofore. At this point in time TSP 4.3.2(2) is on the review schedule but its review has not yet been completed. This violation demonstrates the need for this review to proceed as expeditiously as possible and it serves as an example as to what to look out for during such review. In order to make sure that the reviews take place as expeditiously as possible the following remedy will be implemented.

Remedy 4: NCNR Management will stimulate the review of its inventory of procedures.

Conclusion

The NCNR will present the circumstances of this violation at the next scheduled SEC meeting in April 2015. The NCNR's NRC Inspector, Mr. Craig Bassett has been informed of the violation and will receive a copy of this letter. He and Mr. Mike Morlang from the NRC have reviewed this violation during the facility inspection that took place from March 16-19, 2015. Please contact me or Paul Brand, Chief (A) of Reactor Engineering and Operations, if you have additional questions or require further information.

Sincerely,



Rob Dimeo, Director
NIST Center for Neutron Research.

cc: NCNR Safety Evaluation Committee Chair
Xiaosong Yin, Nuclear Regulatory Commission
Craig Bassett, Nuclear Regulatory Commission.