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ACCESSION NBR:9204020207 DOC.DATE: 92/03/30 NOTARIZED: NO DOCKET #
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SUBJECT: Responds to WO Long 920205 request for info re hot short vulnerabilities at facility,per 10CFR50,App R & Generic Ltr 86-10.Changes made to procedures to provide addl guidance re recovery from fire-induced hot shorts.

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March 30, 1992

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MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Response to Request for Information
Concerning Hot Short Vulnerabilities

In a letter from William O Long dated February 5, 1992, it was requested that we provide a written response to questions concerning potential hot short vulnerabilities at Monticello. Specifically, it was requested that a statement be provided describing our position and intentions with respect to the requirements contained in 10 CFR Part 50, Appendix R and Generic Letter 86-10.

We were first informed of the hot short concerns identified by Susquehanna and WNP-2 via the Nuclear Network. Both utilities had identified hot short vulnerabilities in their designs that could impair safe shutdown capability in the event of a control room fire. After a preliminary evaluation, we determined that Monticello was potentially vulnerable to the same concern. Therefore, a 10 CFR Part 50, Section 50.72 notification was made to the NRC on December 10, 1991 to report a condition believed to be outside the design basis of the plant. It was subsequently determined that the plant was within its original design basis and the notification was retracted.

We have reviewed the Monticello Alternate Shutdown System (ASDS) design in light of the recent discussions with NRC staff. It is our conclusion that the system was designed and installed in agreement with the requirements of 10 CFR Part 50, Appendix R and Generic Letter 86-10 as interpreted by the utility industry and the NRC during that time period. Recent discussions with the NRC technical reviewer responsible for the Monticello Alternate Shutdown System Safety Evaluation Report confirm that the Monticello design is consistent with the philosophy and interpretations prevalent at the time of the review. However, it is recognized that the overall technical issue raised by the Susquehanna and WNP-2 events remains. A number of actions have been initiated to address this issue:

1. Plans already in progress to modify thermal overload settings for motor operated valves have been re-evaluated. These plans were related to issues raised by Generic Letter 89-10 and NRC Inspection Report 50-

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263/87005 (Safety System Functional Inspection). Since the planned modifications will also mitigate the concerns raised by the hot short issue, the schedule to implement these changes on Alternate Shutdown System valves was accelerated.

2. Changes were made to plant operating procedures to provide additional guidance concerning recovery from fire induced hot shorts. These changes included guidance for resetting thermal overloads for pumps and valves and manually actuating motor operated valves that could not be repositioned electrically.

3. A review was initiated to identify Alternate Shutdown System equipment potentially vulnerable to hot shorts of the nature described in the Susquehanna and WNP-2 events. The following assumptions were used for this review:

   a. In the event of a fire in the control room or the cable spreading room, equipment control is transferred to the Alternate Shutdown System panel within 10 minutes. Once transfer has occurred, the Alternate Shutdown System design precludes any control room or cable spreading room hot short concerns. It is during this 10 minute time frame preceding transfer that hot short vulnerabilities exist.

   b. As stated in 10 CFR Part 50, Appendix R and Generic Letter 86-10, the design must be able to cope with hot shorts, shorts to ground and open circuits. All shorts to ground and open circuits have been addressed by the design. With respect to hot shorts, it was assumed that:

      1. Only one hot short need be postulated per system, except for high/low pressure interfaces. In the latter case it was assumed that multiple hot shorts could occur simultaneously.

      2. The design must be able to withstand hot shorts between the individual conductors of a single cable, but not between separate cables. In order for the latter to occur, it would be necessary for the fire to have progressed to the point that catastrophic cable damage had occurred causing total failure of cable insulation and sheathing. It is highly improbable that such severe damage would occur in the first 10 minutes of a fire.

      3. Similarly, intermittent hot shorts (e.g., a short that repeatedly caused a pump to start and stop) were considered to be of sufficiently low probability to allow exclusion from consideration.

For the purpose of the review, hot shorts were divided into three groups. A discussion of the group types and a brief summary of the results of the review is as follows:

Group 1: Hot shorts that could prevent operation or cause maloperation of Alternate Shutdown System equipment without resulting in equipment damage that disables safe shutdown capability.

Conclusion: Monticello is designed for Group 1 hot shorts. Examples include spurious repositioning of valves or breakers and spurious starting or stopping of pumps. Control of equipment needed for safe shutdown can be reestablished at the Alternate Shutdown System panel even if equipment is repositioned.

Group 2: Hot shorts which alone cause maloperation of Alternate Shutdown System equipment with resultant equipment damage that disables safe shutdown capability.

Conclusion: Group 2 hot shorts were not specifically addressed in the original Alternate Shutdown System design since such events were not postulated at that time. Our review of this issue has identified the following components vulnerable to Group 2 hot shorts:

MO-2007 Discharge to Torus Outboard Valve
MO-2009 Torus Cooling Injection/Test Outboard Valve
MO-1987 Torus Suction Valve
MO-2003 Residual Heat Removal Heat Exchanger Bypass Valve
MO-1752 Core Spray Outboard Injection Valve
MO-1750 Core Spray Test Valve
MO-1754 Core Spray Inboard Injection Valve

In all cases, the valves are vulnerable to a short that could drive the valve open or closed while bypassing the motor operator torque and limit switches, potentially damaging the valve and/or the motor operator. This is the same issue addressed by NRC Information Notice 92-18, "Potential for Loss of Remote Shutdown Capability During a Control Room Fire". We plan to expand the scope of the Alternate Shutdown System design to address Group 2 hot shorts.

Group 3: Hot shorts causing maloperation of Alternate Shutdown System equipment that could cause equipment damage and disable safe shutdown capability if the hot short were to occur in proper sequence with another plant event.

Conclusion: Group 3 hot shorts require a specific and unlikely sequence of events in order to damage Alternate shutdown equipment and disable safe shutdown capability. An example would be a hot short that disables the Residual Heat Removal minimum flow valve, followed by an Emergency Core Cooling System auto initiation signal that starts the Residual Heat Removal pump. If the minimum flow valve remains closed and reactor pressure exceeds the pump discharge pressure, the lack of a pump discharge path could damage the pump. Another example would involve a hot short that causes the breaker for #12 Emergency Diesel Generator to close onto an energized bus without the diesel generator running. This would result in excessive currents and a lockout of the diesel generator. If loss of off-site power were to occur after this hot short, the diesel generator might not be available to energize the bus.

It is extremely unlikely that these types of events would occur in the precise sequence and the precise time frame needed to cause equipment damage and disable safe shutdown capability. Therefore, the Alternate Shutdown System need not be design to address these events.

Based on the results of the above review, Group 1 hot shorts are already adequately addressed by the Alternate Shutdown System design. The ability to cope with Group 2 hot shorts will also be considered as a design requirement for the system. Group 3 hot shorts will not be included in the design. The following actions are planned to address Group 2 hot shorts:

1. As noted above, the schedule for resizing thermal overloads for the vulnerable Alternate Shutdown System motor operated valves was accelerated. The thermal overloads for valves MO-1750, MO-1752, MO-1754, and MO-2007 are properly sized. Modification of valve MO-1987 will be completed as soon as the necessary parts can be obtained, which should take approximately one month. Modifications to valves MO-2003 and MO-2009 can only be performed during plant shutdown and will therefore be completed at the earliest opportunity, but in any case no later than the 1993 Refueling outage. This action will protect the valve motors from damage due to Group 2 hot shorts.

2. The manufacturer (Anchor Darling) was asked to analyze what, if any, damage would occur if valves vulnerable to Group 2 hot shorts were subjected to the stall thrust forces generated by a motor operator running until tripped due to thermal overload. The manufacturer determined that several of the valves (MO-1750, MO-1752, MO-1754, MO-2003, MO-2007, and MO-2009) could be damaged by such forces. We are currently identifying and evaluating various modifications that would resolve this concern. A follow up letter will be submitted on or before

July 31, 1992 to describe our plans in this regard.

We are in the process of verifying and documenting the results of our review and will inform you of any changes to our plans as described above. Please contact us if you require additional information.

Thomas M. Parker
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cc: Regional Administrator-III, NRC
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