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September 10, 2015

MEMORADUM TO: Anne T. Boland, Director
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Richard P. Correia, Director /RA/
Division of Risk Analysis
Office of Nuclear Regulatory Research

SUBJECT: TRANSMITTAL OF FINAL SHEARON HARRIS NUCLEAR
POWER PLANT ACCIDENT SEQUENCE PRECURSOR
ANALYSIS

This memorandum transmits the final results of an accident sequence precursor (ASP) analysis of an operational event that occurred at Shearon Harris Nuclear Power Plant on January 18, 2014. The Office of Nuclear Regulatory Research (RES) did not request a formal analysis review from the licensee in accordance with U.S. Nuclear Regulatory Commission Regulatory Issue Summary 2006-24, "Revised Review and Transmittal Process for Accident Sequence Precursor Analyses," because the analysis had a preliminary conditional core damage probability (CCDP) of less than 1×10^{-4} . The final results determined that the operational event had a best estimate CCDP of 6×10^{-6} , and therefore, is not considered a *significant* precursor. A copy of the preliminary analysis was provided to the Office of Nuclear Reactor Regulation (NRR) and Region II staff as a courtesy.

The ASP Program continues to systematically review licensee event reports (LERs) and all other event reporting information [e.g., inspection reports (IRs)] for potential precursors, and to analyze those events which have the potential to be precursors. The complete summary of all Fiscal Year 2014 precursors will be provided in the annual Commission paper on the status of the ASP Program and Standardized Plant Analysis Risk (SPAR) Models due to be issued in October 2015.

Transmittal to Licensee Requested. We are requesting NRR to send the enclosed final ASP analysis to the licensee for their information. The ASP analysis will be made publicly available in 90 days from the date of the memorandum. Please inform us if additional time is needed to send the ASP analysis to the licensee.

CONTACT: Keith Tetter, RES/DRA/PRB
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Final ASP Analysis Summary. A brief summary of the final ASP analysis, including the results, is provided below.

Manual Reactor Trip in Response to 480V Transformer Failure (January 2014) at Shearon Harris Nuclear Power Plant. This event is documented in LER 400/14-001 and in IR 05000400/2014002.

Executive Summary. On January 18, 2014, at 9:31 a.m., Harris Nuclear Plant (HNP) commenced a rapid down-power from 100 percent power in accordance with plant procedures in preparation for de-energizing the 480V 1D2 transformer due to ground faults. Loss of power to the 1D2 bus would result in the main feedwater (MFW) pump recirculation valves fully opening, thus reducing MFW flow to the steam generators. Attempts were made to isolate the grounds per plant procedures, but were unsuccessful. Subsequently, smoke was seen by an operator and was taken as an indication of a fire in the 1D2 transformer cubicle. At 10:11 a.m., while operating at 75 percent power, operators manually tripped the reactor. At 10:13 a.m., the auxiliary feedwater (AFW) system actuated as expected based on low steam generator levels. Auxiliary bus 1D was de-energized at 10:14 a.m. to de-energize the 1D2 transformer, which resulted in a loss of power to the 6.9kV 1A-SA safety bus and the "A" motor-driven AFW pump. The "A" emergency diesel generator automatically started at 10:15 a.m. and re-energized the 1A-SA safety bus and the "A" motor-driven AFW pump. All safety systems responded as expected during this event.

According to the risk analysis modeling assumptions used in this ASP analysis, the most likely core damage sequence is a loss of main feedwater (LOMFW) initiating event with subsequent loss of AFW and failure of feed and bleed cooling. This accident sequence accounts for approximately 46 percent of the CCDP for the event. The second most likely core damage sequence is an LOMFW initiating event followed by a loss of reactor coolant pump (RCP) seal cooling with failure of a RCP seal, failure of high pressure injection, and failure of steam generator secondary side cool down. This accident sequence accounts for approximately 39 percent of the CCDP for the event. In general, these results are consistent with at-power LOMFW events previously analyzed by the ASP Program at other PWRs.

Summary of Analysis Results. This operational event resulted in a best estimate CCDP of 6×10^{-6} . The detailed ASP analysis can be found in the enclosure.

Sensitive Information. The detailed ASP analysis has been reviewed in accordance with current guidance for sensitive unclassified non-safeguards information, and it has been determined that it may be released to the public.

Enclosure:
As stated

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