June 23, 2010

MEMORADUM TO: Joseph G. Giitter, Director
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Christiana H. Lui, Director ***/RA/ D. Coe for***
Division of Risk Analysis
Office of Nuclear Regulatory Research

SUBJECT: TRANSMITTAL OF FINAL ASP ANALYSES

This memorandum provides the final results of two Accident Sequence Precursor (ASP) analyses of operational events that occurred at Oyster Creek Nuclear Generating Station on July 12, 2009 and Wolf Creek Generating Station on August 19, 2009. As described in the U.S. Nuclear Regulatory Commission (NRC) Regulatory Issue Summary 2006-24, "Revised Review and Transmittal Process for Accident Sequence Precursor Analyses," these events are lower risk events ($<1\times10^{-4}$), and therefore, formal peer reviews are not requested.

Nevertheless, RES staff coordinated with members of the Office of Nuclear Reactor Regulation (NRR) and the applicable Regions in an informal review of these analyses. We are transmitting a summary of the analyses results to NRR and the applicable Regions, and requesting NRR to transmit the analyses to the affected licensees for their information.

The ASP program continues to systematically review licensee event reports (LERs) and all other event reporting channels for potential precursors, and to analyze those events which have the potential to be precursors. Most of the precursors that occurred in FY 2009 have been analyzed by the SDP, and therefore do not require review and transmittal of an accident sequence precursor analysis package. The complete summary of FY 2009 ASP events will be presented in the upcoming SECY paper on the Status of the Accident Sequence Precursor Program and Standardized Plant Analysis Risk (SPAR) Models.

Transmittal to Licensee Requested. We are requesting NRR to send the final ASP analyses to the appropriate licensees for information. This memorandum will be publically released. The ASP analyses will be made publically available after the analyses have been transmitted to the respective licensees. The ASP analyses are provided in Enclosure 1 of this memorandum and a model for the transmittal letter can be found in ADAMS at ML062710403.

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Final ASP Analyses to Be Transmitted. The final ASP analyses to be transmitted are listed below.

1. ***Loss of Offsite Power due to Lightning Strike (July 2009) at Oyster Creek.*** This event is documented in LER 219/09-005. Additionally, Region I conducted a special inspection and issued Inspection Report (IR) 05000219/2009009 on September 26, 2009.

   Event Summary. On July 12, 2009, a lightning strike near the Oyster Creek switchyard caused a short circuit that led to the opening of main generator output breakers. Per plant design, a fast closure of the turbine control valves followed with a subsequent reactor scram. The safety-related busses were de-energized and both emergency diesel generators (EDGs) started on their respective bus under-voltage relay signals. The main feed pumps, powered from non-safety-related busses, tripped on loss of power and could not be restarted until offsite power was restored. Relief valves cycled open to limit the reactor coolant system (RCS) pressure increase. Both isolation condensers (ICs) initiated at an RCS pressure of 1051 psig, as designed. The operators cycled the IC condensate return valves, as needed, to control RCS pressure and temperature. Offsite power was restored to the first safety bus 1 hour and 43 minutes after the loss of offsite power occurred.

   Results. This operational event resulted in a mean conditional core damage probability (CCDP) of 5×10^{-5}. An uncertainty analysis for this operating event was also performed resulting in 5% and 95% uncertainty bounds of 9×10^{-8} and 2×10^{-4} respectively. The ASP analysis can be found at ML101600186.

2. ***Loss of Offsite Power due to Lightning Strike near Transmission Lines (August 2009) at Wolf Creek.*** This event is documented in LER 482/09-002. Additionally, Region IV conducted a special inspection and issued IR 05000482/2009007 on February 2, 2010.

   Event Summary. On August 19, 2009, Wolf Creek Generating Station experienced a complete loss of offsite power to the two essential bus transformers due to a lightning strike causing a fault four miles to the east of the plant. The main generator experienced a rapid load change resulting in a turbine trip and subsequent reactor trip. All reactor coolant pump motors tripped on under-frequency. The EDGs started and loaded onto the two safety-related busses. The first transmission line was restored within one minute. Offsite power was restored to the first safety bus 1 hour and 50 minutes after the event occurred.

   Results. This operational event resulted in a mean CCDP of 8×10^{-6}. An uncertainty analysis for this operating event was also performed resulting in 5% and 95% uncertainty bounds of 2×10^{-6} and 2×10^{-5} respectively. The ASP analysis can be found at ML101600194.

Sensitive Information. The detailed ASP analyses referenced above have been reviewed in accordance with current Sensitive Unclassified Non-Safeguards Information guidance and can be released to the public.

ASP Quality Review Process. All precursor analyses undergo technical reviews prior to their issuance. Initially, an independent technical review is performed by an ASP analyst. Using ASP analysis review procedures, the reviewer performs confirmatory SPAR model runs to verify

the analysis assumptions. In addition, the reviewer will examine supporting documentation (e.g., LERs, IRs) to verify the functionality and potential recovery of failed equipment. After completion of the initial review and any corresponding revisions by the lead analyst, technical audits by senior staff and branch management are performed on all analyses prior to their issuance.

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