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June 21, 2022

MEMORADUM TO: Raymond V. Furstenau
Director of Nuclear Regulatory Research

FROM: Christian J. Araguas, Director (Acting)
Division of Risk Analysis
Office of Nuclear Regulatory Research

Christian Araguas Signed by Araguas, Christ on 06/21/22

SUBJECT: TRANSMITTAL OF THE ACCIDENT SEQUENCE PRECURSOR PROGRAM 2021 ANNUAL REPORT

This memorandum transmits the Accident Sequence Precursor (ASP) Program 2021 Annual Report. The ASP Program assesses licensee event reports (LERs) at U.S. nuclear power plants to identify potential precursors to core damage.

There were 135 licensee LERs issued in calendar year 2021. From these LERs, 104 (approximately 77 percent) were screened out in the initial screening process and 31 events were selected and analyzed as potential precursors. The overall number of LERs and potential precursors continues to decrease to historical lows.

Of the 31 potential precursors, 4 events were determined to exceed the ASP Program threshold and, therefore, are precursors. An independent ASP analysis was performed to determine the risk significance for three of these precursors. One precursor was the result of a greater-than-*Green* inspection finding.

No significant precursors were identified in 2021. One important precursor (i.e., conditional core damage probability (CCDP) or increase in core damage probability greater than or equal to 10^{-4}) was identified. This precursor was the result of a loss of offsite power at Waterford Steam Electric Station (Unit 3), which had CCDP of 5×10^{-4}.

A review of the trends over the past decade (2012–2021) reveals statistically significant decreasing trends for all precursors and most precursors subgroups (e.g., initiating events, degraded conditions, losses of offsite power, precursors at pressurized-water reactors, etc.). However, no statistically significant trends were identified for important precursors and emergency diesel generator degraded conditions during this same period.

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These ASP trends, along with the results of the ASP index, indicate that NRC oversight and licensing activities remain effective and that licensee risk management initiatives are not resulting in an increasing risk profile for the industry. In addition, there are no indications of increasing risk due to the potential “cumulative impact” of risk-informed initiatives and no new component failure modes or mechanisms were identified.

Enclosure:
Transmittal of ASP Program 2021
Annual Report

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