



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 16, 2020

Mr. Don Moul
Executive Vice President, Nuclear
Division, and Chief Nuclear Officer
Florida Power & Light Company
Mail Stop: EX/JB
700 Universe Blvd.
Juno Beach, FL 33408

SUBJECT: TRANSMITTAL OF PRELIMINARY DUANE ARNOLD ENERGY CENTER
ACCIDENT SEQUENCE PRECURSOR REPORT (LICENSEE EVENT
REPORT 331-2020-001-01)

Dear Mr. Moul:

By letter dated September 30, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. [ML20283A373](#)), Duane Arnold Energy Center (Duane Arnold) submitted licensee event report (LER) LER 331-2020-001, "Notice of Unusual Event and Unit Trip Due to Loss of Offsite Power Due to High Winds," to the U.S. Nuclear Regulatory Commission (NRC) staff pursuant to Title 10 of the *Code of Federal Regulations* Section 50.73. As part of the Accident Sequence Precursor (ASP) Program, the NRC staff reviewed the event to identify potential precursors and to determine the probability of the event leading to a core damage state. The results of the analysis are provided in the enclosure to this letter.

The preliminary analysis results in a mean conditional core damage probability (CCDP) of 1×10^{-3} . Therefore, in accordance with [Regulatory Issue Summary 2006-24](#), "Revised Review and Transmittal Process for Accident Sequence Precursor Analyses" (ADAMS Accession No. ML060900007), the licensee has period of 60 days to formally comment on the analysis. Any input received from the licensee during this period will be considered prior to finalizing the ASP analysis.

Preliminary ASP Analysis Summary. A brief summary of the preliminary ASP analysis, including the results, is provided below.

Loss of Offsite Power Caused by High Winds during Derecho. This event is documented in [LER 331-2020-001](#) and [inspection report 05000331/2020003](#).

Executive Summary. On August 10, 2020, severe thunderstorms and high winds caused a grid perturbation that resulted in an automatic start of both emergency diesel generators (EDGs).

The enclosure transmitted herewith contains sensitive unclassified non-safeguards information. When separated from the enclosure, this document is decontrolled.

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The EDGs did not immediately energize their respective safety buses because offsite power remained available. However, approximately 14 minutes later, a loss of offsite power (LOOP) occurred that resulted in a reactor trip. The output breakers for both EDGs automatically closed to reenergize the safety buses. The licensee declared an Unusual Event. All control rods successfully inserted. Reactor inventory control was maintained by reactor core isolation cooling (RCIC) and the safety relief valves (SRVs) were used to remove decay heat to the torus.

The high winds resulted in minor damage to reactor, turbine, and FLEX buildings, along with more severe damage to the nonsafety-related cooling towers. The licensee later determined that damage to the reactor building resulted in the secondary containment being inoperable according to technical specifications (TS) due to insufficient vacuum. In addition, the high winds resulted in increased debris loading to the essential service water (ESW) system, which caused clogging of the train 'B' strainer and subsequent decrease of ESW flow of 300 gpm to EDG 'B'. Operators successfully bypassed the strainer. Although the operators declared EDG 'B' inoperable according to TS, it did not experience any problems due to the use of unstrained ESW and ran successfully throughout the event. Operators restored offsite power to the safety buses approximately 25 hours after the LOOP occurred.

This ASP analysis reveals that the most likely core damage sequence is a weather-related LOOP initiating event and the subsequent (postulated) failure of both EDGs resulting in a station blackout (SBO) with the postulated failures of both high-pressure coolant injection and RCIC and the inability of operators to recover alternating current power within 30 minutes. This accident sequence accounts for approximately 28 percent of the total CCDP for this event. Although the preliminary mean CCDP of 1×10^{-3} for this event currently meets the criterion for a significant precursor, the risk to the public remained very low because defense in depth and plant-wide safety margins were maintained.

FLEX mitigation strategies were credited in this analysis and significantly reduced (by almost approximately 700 percent) the risk of this event. Throughout the review of this event, the analysis assumptions and results were systematically reviewed to identify necessary standardized plant analysis risk model changes that were implemented to realistically represent the event and expected plant response. In addition, analysis results were also used to identify key sources of uncertainty.

The risk of this event was significantly impacted by the SBO scenarios. The risk associated with the SBO scenarios is particularly high for this plant because of having only two EDGs (i.e., no other diesel generators available besides FLEX equipment) and the inability to crosstie safety-related buses from another unit as Duane Arnold is a single unit site.

Summary of Analysis Results. The preliminary mean CCDP for this operational event is 1×10^{-3} .

The preliminary ASP analysis is being transmitted separately from this cover letter. The preliminary ASP analysis is non-public as it contains predecisional information. The preliminary ASP is subject to change, as the NRC staff considers inputs from internal and external stakeholders in its review process which is ongoing. Once the NRC staff finalizes the ASP analysis, the staff will issue a public version of the ASP analysis. Please provide comments on the preliminary ASP analysis by February 15, 2021.

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If you have any questions, please contact me at 301-415-2855, or at Scott.Wall@nrc.gov.

Sincerely,

/RA/

Scott P. Wall, Senior Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:
Preliminary ASP Analysis

cc without Enclosure: Listserv

ENCLOSURE

Preliminary Accident Sequence Precursor Analysis – Duane Arnold Energy Center, Loss of Offsite Power Caused by High Winds during Derecho (LER 331-2020-001) – Precursor

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SUBJECT: TRANSMITTAL OF PRELIMINARY DUANE ARNOLD ENERGY CENTER
ACCIDENT SEQUENCE PRECURSOR REPORT (LICENSEE EVENT
REPORT 331-2020-001) DATED DECEMBER 16, 2020

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ADAMS Accession Nos.:

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ML20324A229 (ASP Report - preliminary, non-public)

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