



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

December 9, 2020

Mr. Don Moul
Executive Vice President, Nuclear
Division and Chief Nuclear Officer
NextEra Energy Duane Arnold, LLC
Mail Stop: EX/JB
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Juno Beach, FL 33408

SUBJECT: DUANE ARNOLD ENERGY CENTER – WITHDRAWAL OF ORDER EA-12-049,
“ORDER MODIFYING LICENSES WITH REGARD TO REQUIREMENTS FOR
MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL
EVENTS” (EPID NO. L-2019-JLD-0021)

Dear Mr. Moul:

This letter documents the withdrawal of Order EA-12-049, “Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events” (the Order) at Duane Arnold Energy Center (Duane Arnold), in accordance with the timing and technical considerations described below.

By letter dated March 12, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12054A735), the U.S. Nuclear Regulatory Commission (NRC, the Commission) issued the Order to NextEra Energy Duane Arnold, LLC (NextEra, the licensee). This order requires certain actions at Duane Arnold associated with the Fukushima Near-Term Task Force recommendations. Specifically, the Order directed all power reactor licensees, and holders of construction permits in active or deferred status, to develop and implement strategies to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities in the event of a beyond-design-basis external event (BDBEE).

Section IV of the Order required that NextEra submit to the Commission for review an overall integrated plan by February 28, 2013, describing how Duane Arnold will achieve compliance with the requirements of the Order. The licensee responded to the Order by letter dated February 28, 2013 (ADAMS Accession No. ML13063A148). By letter dated December 7, 2016 (ADAMS Accession No. ML16347A010), the licensee notified the NRC that full compliance with the Order had been achieved at Duane Arnold. The NRC staff issued a safety evaluation describing its review of the Duane Arnold order compliance plan on May 26, 2017 (ADAMS Accession No. ML17129A037) and documented a compliance inspection at the Duane Arnold site by letter dated October 17, 2017 (ADAMS Accession No. ML17292A738).

Section IV of the Order also stipulates that the NRC’s Director of the Office of Nuclear Reactor Regulation may, in writing, relax or rescind any of the conditions of the Order upon demonstration by the licensee of good cause.

By letter dated January 18, 2019 (ADAMS Accession No. ML19023A196), NextEra submitted to the NRC a certification of permanent cessation of operations for Duane Arnold in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.82(a)(1)(i). In this letter, NextEra provided formal notification of the intention to permanently cease operations at Duane Arnold in the fourth quarter of 2020. This letter was supplemented by a letter dated March 2, 2020 (ADAMS Accession No. ML20062E489), to certify that NextEra plans to permanently cease power operations at Duane Arnold on October 30, 2020. By letter dated August 27, 2020 (ADAMS Accession No. ML20240A067), NextEra certified to the NRC that it had permanently ceased operations at Duane Arnold on August 10, 2020. By letter dated October 12, 2020 (ADAMS Accession No. ML20286A317), the licensee notified the NRC under 10 CFR 50.82(a)(1)(ii) that, as of October 12, 2020, all fuel has been permanently removed from the Duane Arnold reactor vessel and placed in the SFP. Further, NextEra confirmed its understanding that, under 10 CFR 50.82(a)(2), the Duane Arnold 10 CFR Part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel.

By letter dated November 21, 2019 (ADAMS Accession No. ML19325C761), NextEra requested relief from the provisions of the Order applicable to the core cooling and containment capability safety functions, to be effective upon the docketing of the 10 CFR 50.82(a)(1)(i) and (ii) certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel. In that letter, NextEra also requested rescission of the Order, effective at the end of a 90-day period following the permanent cessation of operations, when the decay heat load in the SFP has sufficiently decreased to a point where the Order requirements for maintaining the SFP cooling safety function after a BDBEE are not necessary.

According to the licensee's November 21, 2019, letter, the absence of fuel in the reactor vessel which removes any challenges to the primary containment render the development, implementation, and maintenance of guidance and strategies to maintain or restore core cooling and primary containment capabilities unnecessary. The NRC staff concludes that NextEra's certifications provided under 10 CFR 50.82(a)(1), combined with the regulatory prohibition of 10 CFR 50.82(a)(2) and the licensee's acknowledgement that the Duane Arnold 10 CFR Part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel, demonstrate good cause for the withdrawal of the core cooling and containment capability safety function requirements specified in Order EA-12-049 with respect to Duane Arnold.

In its November 21, 2019, letter, the licensee also requested the rescission of the Order, effective 90 days after the permanent cessation of operations. This portion of the licensee's request relates to the SFP cooling safety function requirements of the Order. In its letter, NextEra provided the following information to demonstrate good cause for the requested rescission of the Order:

- The fuel in the Duane Arnold SFP will have had at least 90 days of radioactive decay when the requested rescission becomes effective.
- Since Duane Arnold has become a permanently shutdown and defueled facility, the safety of the fuel in the SFP has become the primary safety function for site personnel. In the event of a challenge to the safety of fuel stored in the SFP, decision-makers would not have to prioritize actions, and the focus of the facility staff would be the SFP condition.

According to the licensee, NextEra has performed an evaluation to demonstrate that adequate time and resources will be available to restore spent fuel pool cooling and maintain that function indefinitely. The analysis demonstrates the ability to maintain an SFP level of at least 10 feet above the top of the spent fuel. Existing standard portable fire pumps deliver adequate head and flow to provide the minimum required makeup to the SFP. The licensee's analysis shows that the equipment needed can be installed in approximately 6 hours to start delivering the required SFP makeup flow. The licensee notes that this equipment and the installation procedures are required to be maintained by the Duane Arnold 10 CFR Part 50 license, section 2.C(9), "Mitigation Strategy License Condition," item (b)(7) (equipment needed for compliance with 10 CFR 50.54(hh)(2), which is now 10 CFR 50.155(b)(2)).

Based on the calculated decay heat level at 90 days after the permanent cessation of operations, the time to reach boiling conditions and then reduce SFP water inventory to a level 10 feet above the top of the spent fuel racks would be approximately 67.2 hours, or 2.8 days. This time would thus be available to respond to any extended loss of power impacting the normal SFP cooling system, such as what could occur following a BDBEE, prior to water level reaching a point where it may no longer maintain substantial shielding for a person standing on the SFP operating deck.

The NRC staff reviewed the licensee's statements with regard to decay heat levels and determined through a confirmatory evaluation that the licensee's predicted fuel decay heat levels and the SFP thermal-hydraulic estimate under loss of cooling conditions were reasonable.

The NRC staff concludes that, as of 90 days after the permanent cessation of operations, given the low decay heat levels and the slow heat up rate, the reliance on the SFP water inventory for passive cooling will provide a level of protection equivalent to that which would be provided by the initial phase of the guidance and strategies for maintaining or restoring SFP cooling capabilities, which would otherwise be necessary for compliance with the Order.

The NRC staff further concludes that the long time for boiling to reduce the SFP inventory to a point at which makeup would be necessary for radiation shielding purposes eliminates the need for the transition phase of the guidance and strategies for maintaining or restoring SFP cooling capabilities, which would otherwise be necessary for compliance with the Order through using onsite portable equipment.

The staff concludes that, as of 90 days after the permanent cessation of operations, the low decay heat and the long boil-off period of the SFP provides sufficient time for the licensee to obtain resources for SFP cooling via the Extensive Damage Mitigation Guideline equipment available for compliance with the requirements of 10 CFR 50.155(b)(2) (formerly 10 CFR 50.54(hh)(2)). In addition, the staff has verified that Letters of Agreement are in place with local fire departments to provide emergency support and trained manpower with the capabilities to provide makeup cooling water for SFP cooling upon request, in addition to fire suppression and medical response. Thus, this equipment is available to be deployed on an ad hoc basis to sustain the SFP cooling safety function indefinitely, eliminating the need for the final phase of the guidance and strategies for maintaining or restoring SFP cooling capabilities, which would otherwise be necessary for compliance with the Order. Finally, the NRC staff notes that the basis for the proposed withdrawal is consistent with the Statements of Consideration published in the *Federal Register* for the "Mitigation of Beyond-Design-Basis Events, Final Rule [10 CFR 50.155]." Specifically, 10 CFR 50.155(a)(2)(ii) provides an exemption from the applicability of the SFP cooling capability requirements of the regulation

once the 10 CFR 50.82(a)(1) certifications have been submitted and it is demonstrated by an analysis, retained by the licensee, that the decay heat of the fuel in the SFP can be removed solely by heating and boiling of water within the SFP and the boil-off period provides sufficient time for the licensee to obtain off-site resources to sustain the SFP cooling function indefinitely.

Because the licensee for Duane Arnold has docketed the 10 CFR 50.82(a)(1)(i) and (ii) certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, and has acknowledged, consistent with 10 CFR 50.82(a)(2), that the Duane Arnold 10 CFR Part 50 license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel, the NRC staff has determined that the licensee has demonstrated good cause for the withdrawal of the Order requirements regarding core cooling and containment capability safety functions, effective immediately. Further, considering the information presented in the licensee's November 19, 2019, letter regarding decay heat level, the NRC staff has concluded that the licensee has demonstrated good cause for the withdrawal of the Order requirements in their entirety, effective 90 days after the permanent cessation of operations, which corresponds to November 9, 2020.

Based on the above, the NRC staff concludes that the licensee has demonstrated good cause for the withdrawal of Order EA-12-049. Accordingly, the NRC is withdrawing its March 12, 2012, Order EA-12-049, with respect to Duane Arnold.

Sincerely,

Ho K. Nieh, Director
Office of Nuclear Reactor Regulation

Docket No. 50-331

cc: Listserv

SUBJECT: DUANE ARNOLD ENERGY CENTER – RELAXATION AND WITHDRAWAL OF ORDER EA-12-049, “ORDER MODIFYING LICENSES WITH REGARD TO REQUIREMENTS FOR MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS” (EPID NO. L-2019-JLD-0021) DATED: DECEMBER 9, 2020

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***concurrence via email**

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