



February 29, 2016

NG-16-0049  
10 CFR 2.202

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Duane Arnold Energy Center  
Docket No. 50-331  
Renewed Op. License No. DPR-49

NextEra Energy Duane Arnold Energy Center, LLC's Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

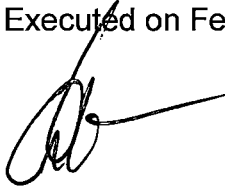
- References: 1) Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012 (ML12056A045)
- 2) Letter, R. Anderson (NextEra Energy Duane Arnold, LLC) to U. S. NRC, "NextEra Energy Duane Arnold, LLC's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," NG-13-0084, dated February 28, 2013 (ML13063A148)

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Reference 1, an immediately effective Order to all licensees including NextEra Energy Duane Arnold, LLC (hereafter NextEra Energy Duane Arnold). In Reference 2, NextEra Energy Duane Arnold submitted an Overall Integrated Plan for the implementation of this Order. The Order required Licensee's to provide periodic status reports for the Overall Integrated Plan.

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The purpose of this letter is to provide the next six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The enclosure to this letter provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

I declare under penalty of perjury that the foregoing is true and correct.  
Executed on February 29, 2016.



T. A. Vehec  
Vice President, Duane Arnold Energy Center  
NextEra Energy Duane Arnold, LLC

Enclosure

cc: Regional Administrator, USNRC, Region III  
Resident Inspector, USNRC, Duane Arnold Energy Center  
Project Manager, USNRC, Duane Arnold Energy Center

Attachment to NG-16-0049

NextEra Energy Duane Arnold, LLC's Six Month Status Report for the  
Implementation of Order EA-12-049, Order Modifying Licenses with Regard to  
Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

8 pages follow

# NextEra Energy Duane Arnold, LLC's Six Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events

## 1. Introduction

NextEra Energy Duane Arnold, LLC (hereafter, NextEra Energy Duane Arnold) developed an Overall Integrated Plan (Reference 2), documenting the diverse and flexible strategies (FLEX), in response to Reference 1. This attachment provides an update of milestone accomplishments since submittal of the Overall Integrated Plan, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

## 2. Milestone Accomplishments

The following milestone(s) have been completed since the submittal of the last six month update (Reference 8), and are current as of January 31, 2016.

- Submit 6 month status report
- Complete Regional Response Center Arrangements
- Issue Modification Packages

## 3. Milestone Schedule Status

The following provides an update to Attachment 4 of the Overall Integrated Plan (Reference 2) as modified by Reference 3. It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed.

The revised milestone target completion dates do not impact the order implementation date.

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit Overall Integrated Implementation Plan	February 2013	Completed	N/A
Submit 6 Month Status Report	August 2013	Completed	N/A
Complete Revision to Emergency Operating Procedures to Extend Operation of Steam Driven Pumps	December 2013	Completed January 2014	N/A
Submit 6 Month Status Report	February 2014	Completed	N/A
Complete Regional Response Center Arrangements	December 2015	Completed	N/A
Submit 6 Month Status Report	August 2014	Completed	N/A
First Refueling Outage of Implementation Period	RFO 24 (Fall 2014)	Completed	N/A

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Complete Site Specific Analysis of NEDC-33771P Rev. 1	January 2015	Completed	N/A
Submit 6 Month Status Report	February 2015	Completed	N/A
FLEX Storage Buildings Completed	March 2015	Completed	N/A
Identified Portable Equipment Stored on Site	Dec 2015	Started	May 2016 Procurement of primary portable equipment is complete.
Submit 6 Month Status Report	August 2015	Completed	N/A
Issue Modification Packages	December 2015	Completed	N/A
Submit 6 Month Status Report	February 2016	Completed with this submittal	N/A
Complete Staffing Study for Flex Implementation	May 2016	Started	N/A
Validate that time sensitive actions can be completed consistent with the Flex Strategies	August 2016	Not Started	N/A
Complete Implementing Procedure Development and Validation	August 2016	Started	N/A
Submit 6 Month Status Report	August 2016	Not Started	N/A
Complete Required Training	September 2016	Started	N/A
Final Implementation Outage for Modifications	RFO 25 (Fall 2016)	Not Started	N/A
Submit Completion Report	December 2016	Not Started	N/A

#### 4. Changes to Compliance Method

Changes in compliance methods have been described in previous six month status updates (References 7 and 8). There were no additional changes to the compliance strategy identified during this period.

#### 5. Need for Relief/Relaxation and Basis for the Relief/Relaxation

NextEra Energy Duane Arnold expects to comply with the order implementation date and no relief/relaxation is required at this time.

#### 6. Open Items from Overall Integrated Plan and Interim Staff Evaluation

The following tables provide a summary of the open items documented in the Overall Integrated Plan or the Interim Staff Evaluation (SE) and the status of each item.

	<b>Overall Integrated Plan Pending Actions</b>	<b>Status</b>
1	Seismic re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. As the re-evaluations are completed, appropriate issues will be entered into the corrective action process and addressed.	Completed. Reference 5 submitted the seismic re-evaluation to the NRC. No issues impacting the implementation of Order EA-12-049 were identified.
2	Flood re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. As the re-evaluations are completed, appropriate issues will be entered into the corrective action process and addressed.	Completed. Reference 6 submitted the Flood re-evaluation to the NRC. No issues impacting the implementation of Order EA-12-049 were identified.
3	Implement revisions to emergency operating procedures (EOPs) identified by the BWROG to extend operation of steam driven pumps for core cooling during ELAP.	Completed
4	Validate implementing procedures can be performed in a timely manner.	Not Started
5	Final plant specific analysis for an ELAP will be performed with equivalent acceptance criteria with the exception of Condensate Storage Tank (CST) inventory and suppression pool level which will be altered in recognition of the external hazards and revised duration of the mitigating strategies.	Completed
6	Phase 3 activities will ensure adequate inventory of water can be provided directly from the Cedar River or other sources independent of the normal River Water Supply pumps.	Started
7	Implement new and revised plant procedures for FLEX Strategies.	Started
8	Implement administrative controls for the FLEX Program.	Started
9	Procure FLEX portable equipment.	Started
10	Establish preventive maintenance and testing of FLEX portable equipment.	Started
11	Revise UFSAR and TRM as needed to reflect FLEX program.	Not started
12	Complete training of applicable personnel.	Started
13	Establish "Playbook" for Regional Response Center interface with the NextEra Energy Duane Arnold.	Started
14	Review generic BWROG analysis of FLEX implementation and perform a detailed review of suppression pool temperature to support FLEX strategies.	Completed
15	Perform analysis of final load shedding strategy for essential station batteries and implement in plant procedures.	Completed

	<b>Overall Integrated Plan Pending Actions</b>	<b>Status</b>
16	Modify the plant to establish a flood staging area for portable equipment.	Started
17	Evaluate deployment routes for portable equipment.	Started
18	Modify the plant to facilitate connection of portable power supplies. This will include connection points for a 480 volt generator to essential battery chargers and 480 volt distribution panel 1B03. Quick connection points will be established for 120 volt AC power to instrument power supplies.	Started. Detail design has concluded the preferred connection point is at 1B032.
19	Modify the plant to add suction and injection connection points for portable pump. The portable pump suction will allow access to the circulating water pit (Pump House) from a protected area (Turbine Building) during a design bases flood. The injection point will provide a redundant connection point for RPV makeup located in a protected area (Reactor Building).	Started. The proposed modification is revised to allow access to the Main Turbine Condenser System hot well rather than the circulating water pit during a design bases flood.
20	Construct two FLEX portable equipment storage buildings. The buildings will be separated to minimize the potential for a single tornado path to interact with both buildings.	Completed
21	Phase 3 activities will ensure essential bus can be re-powered using a portable 4160 V Generator. This will include a modification that establishes a transfer panel (disconnect switch) installed in the turbine building that provides a location for connection during a design bases flood and procedures for mobilization.	Started. Detail design has concluded a temporary connection into an existing breaker to allow ready connection of the portable generator to station 4160 Volt distribution provides a more flexible option.
22	Procedures will provide for opening containment vent valves using portable pneumatic supply.	Procedures currently exist but will be reviewed in association with modification development under Order EA-13-109.
23	Modify the plant to establish a manual vent capability for the reactor building near the spent fuel pool.	Started
24	Update analysis of room heat-up during an ELAP.	Started
25	Screen BWROG RCIC Durability Study for extending RCIC operation during an ELAP and make applicable improvements.	Started
26	Establish methods to recharge communications equipment.	Completed
27	Establish methods to re-fuel portable equipment.	Started
28	Review generic BWROG analysis of FLEX implementation and perform a detailed review of limitations on SRV operation to support FLEX strategies.	Completed
29	If FLEX transport paths are over previously un-excavated ground, review path for potential soil liquefaction during a seismic event.	Completed.

Item Number	Interim Staff Evaluation Open and Confirmatory Items	Status
3.1.1.4.A	Off-Site Resources – Confirm the location of the local staging area for the RRC equipment, and that access routes to the site, the method of transportation, and the drop off area have been properly evaluated for all applicable hazards.	Completed
3.1.2.A	Confirm the actual flood hazard level for which reasonable protection and a means to deploy the portable equipment is to be provided.	Completed. Reference 6 submitted the Flood re-evaluation to the NRC. No issues impacting the implementation of Order EA-12-049 were identified.
3.1.3.1.A	Confirm that the separation of the two FLEX equipment storage buildings is sufficient to reasonably ensure that one set of equipment will be available, accounting for local tornado data (speed and direction), the actual separation distance of the buildings, and the axis between them.	Completed
3.2.1.1.A	From the June 2013, position paper (ADAMS Accession No. ML 13190A201), as discussed in the NRC endorsement letter dated October 3, 2013 (ADAMS Accession No. ML 13275A318), confirm that benchmarks are identified and discussed which demonstrate that the Modular Accident Analysis Program (MAAP) 4 is an appropriate code for the simulation of an ELAP event at Duane Arnold.	Completed
3.2.1.1.B	Confirm that the collapsed vessel level in the MAAP4 analysis remains above Top of Active Fuel (TAF) and the cool down rate is within technical specification limits.	Completed
3.2.1.1.C	Confirm that MAAP4 is used in accordance with Sections 4.1, 4.2, 4.3, 4.4, and 4.5 of the June 2013, position paper.	Completed
3.2.1.1.D	Confirm that in using MAAP4, the subset of key modeling parameters cited from Tables 4-1 through 4-6 of the "MAAP4 Application Guidance, Desktop Reference for Using MAAP4 Software, Revision 2" (Electric Power Research Institute Report 1020236) is justified. This should include response at a plant-specific level regarding specific modeling options and parameter choices for key models that would be expected to substantially affect the ELAP analysis performed for that licensee's plant. Parameters considered important in the simulation of the ELAP event by the vendor/licensee include nodalization, general two-phase flow modeling, modeling of heat transfer and losses, choked flow, vent line pressure losses, and decay heat.	Completed



Item Number	Interim Staff Evaluation Open and Confirmatory Items	Status
3.2.1.1.E	Confirm that the specific MAAP4 analysis case that was used to validate the timing of the mitigating strategies in the Integrated Plan is identified. Alternately, a comparable level of information may be included in the supplemental response.	Completed
3.2.1.3.A	The licensee plans to revise its procedures to be consistent with the BWROG recommendations for extending the availability of steam-driven core cooling systems. Confirm that the technical justification for the recommendations is applicable to DAEC.	Started
3.2.1.8.A	Confirm that the two portable diesel-driven pumps sized in accordance with 10 CFR 50.54(hh)(2) requirements will have sufficient capability to be used as credited in the FLEX strategies implemented pursuant to Order EA-12-049.	Started
3.2.3.A	Confirm that the DAEC implementation of BWROG EPG/SAG, Revision 3, including any associated plant-specific evaluations, is completed in accordance with the provisions of the NRC endorsement letter dated January 9, 2014.	Started
3.2.4.2.A	Confirm that the updated analyses of room heat-up (and any supporting actions) ensure that adequate cooling is provided to equipment needed during an ELAP event.	Not Started
3.2.4.2.B	Confirm that any equipment in the reactor building needed for ELAP mitigation during Phases 2 or 3 will not be compromised by the steam environment caused by SFP boiling.	Started
3.2.4.4.A	The NRC staff has reviewed the licensee communications assessment (ADAMS Accession No. ML12307A120) and has determined that the assessment and planned upgrades are reasonable (ADAMS Accession No. ML13142A320). Confirm that the upgrades to the site's communications systems have been completed.	Completed
3.2.4.6.A	Confirm that DAEC's plan addresses accessibility and habitability of all plant areas requiring personnel access in sufficient detail to determine if the environmental conditions support the needed operator actions.	Started
3.2.4.7.A	Confirm that the potential effects of using river water, which may contain suspended solids, for reactor/SFP cooling are addressed.	Completed
3.2.4.9.A	Confirm that a refueling strategy for FLEX equipment has been developed based on a plant-specific analysis. The confirmation should include delivery capabilities, including for an indefinite coping period, and how fuel quality will be assured, if stored for extended periods (including fuel contained in the fuel tanks of Phase 2 equipment).	Started

Item Number	Interim Staff Evaluation Open and Confirmatory Items	Status
3.2.4.10.A	Confirm that the final load shedding analysis has been completed and that the time constraints assumed in the mitigating strategies have been validated, based on the results of that analysis (DAEC Open Action Item 15).	Completed
3.4.A	Offsite resources - Confirm that NEI 12-06, Section 12.2 guidelines 2 through 10, regarding minimum capabilities for offsite resources, have been adequately addressed.	Started

## 7. Potential Interim Staff Evaluation Impacts

There are no potential impacts to the Interim Staff Evaluation identified at this time.

## 8. References

- 1) Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012 (ML12056A045)
- 2) Letter, R. Anderson (NextEra Energy Duane Arnold, LLC) to U. S. NRC, "NextEra Energy Duane Arnold, LLC's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," NG-13-0084, dated February 28, 2013 (ML13063A148)
- 3) Letter, T.A. Vehec (NextEra Energy Duane Arnold, LLC) to U. S. NRC, "NextEra Energy Duane Arnold Energy Center, LLC's Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)" NG-14-0200, dated August 25, 2014 (ML 14239A493)
- 4) NRC Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions," dated June 6, 2013. (ML13143A321)
- 5) Letter, R. Anderson (NextEra Energy Duane Arnold, LLC) to U. S. NRC "NextEra Energy Duane Arnold, LLC Seismic Hazard and Screening Report (CEUS Sites), Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident" (NG-14-0092), dated March 28, 2014 (ML14092A331)
- 6) Letter, R. Anderson (NextEra Energy Duane Arnold, LLC) to U. S. NRC "Response to NRC Request for Information Pursuant to 10CFR 50.54(f) Regarding Recommendation 2.1, Flooding. Of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident; Flood Hazard Reevaluation Report" (NG-14-0076), dated March 10, 2014 (ML14072A019)

- 7) Letter, T. A. Vehec (NextEra Energy Duane Arnold, LLC) to U. S. NRC, "NextEra Energy Duane Arnold Energy Center, LLC's Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)" (NG-15-0032, dated February 19, 2015 (ML15054A006))
  
- 8) Letter, T. A. Vehec (NextEra Energy Duane Arnold, LLC) to U. S. NRC, "NextEra Energy Duane Arnold Energy Center, LLC's Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)" (NG-15-0260, dated August 14, 2015 (ML15246A409))