



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

February 8, 2016

Mr. C. R. Pierce
Regulatory Affairs Director
Southern Nuclear Operating Co., Inc.
P. O. Box 1295, Bin 038
Birmingham, AL 35201-1295

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2 – REPORT FOR THE
AUDIT REGARDING IMPLEMENTATION OF MITIGATING STRATEGIES
RELATED TO ORDER EA-12-049 (TAC NOS. MF0716 AND MF0717)

Dear Mr. Pierce:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Issuance of Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," and Order EA-12-051, "Issuance of Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation" (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12054A736 and ML12054A679, respectively). The orders require, in part, that all holders of operating reactor licenses and construction permits issued under Title 10 of the *Code of Federal Regulations* Part 50 to submit for review Overall Integrated Plans (OIPs), including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

By letter dated February 27, 2013 (ADAMS Accession No. ML13059A387), Southern Nuclear Operating Company, Inc. (SNC, the licensee) submitted its OIP for the Joseph M. Farley Nuclear Plant, Units 1 and 2 (Farley) in response to Order EA-12-049. By letters dated August 27, 2013, February 26, 2014, August 26, 2014, February 26, 2015, and August 27, 2015 (ADAMS Accession Nos. ML13240A240, ML14058B028, ML14239A291, ML15057A245, and ML15239B294, respectively), SNC submitted its first five six-month updates to the OIP. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the Farley interim staff evaluation (ISE) on January 17, 2014 (ADAMS Accession No. ML13337A584), and continues with in-office and onsite portions of this audit.

By letter dated February 27, 2013 (ADAMS Accession No. ML13059A388), SNC submitted its OIP for Farley in response to Order EA-12-051. The NRC staff issued a request for additional information (RAI) on August 1, 2013 (ADAMS Accession No. ML13203A210). By letters dated August 20, 2013, August 27, 2013, February 26, 2014, August 26, 2014, and February 26, 2015 (ADAMS Accession Nos. ML13233A111, ML13240A219, ML14057A779, ML14239A328, and ML15057A302, respectively), SNC submitted its RAI response and first four six-month updates to the OIP. The NRC staff issued the Farley ISE on October 30, 2013 (ADAMS Accession No. ML13294A496). Since the licensee informed the NRC staff on June 26, 2015


(ADAMS Accession No. ML15182A175), and January 14, 2015 (ADAMS Accession No. ML15014A422), that it had achieved full compliance with the requirements of NRC Order EA-12-051 for Farley, Units 1 and 2, respectively, the NRC staff did not perform an audit of the spent fuel pool instrumentation.

The ongoing audit process allows the NRC staff to review open and confirmatory items from the mitigation strategies ISE, the licensee's integrated plan, and other audit questions. Additionally, the NRC staff gains a better understanding of submitted or updated information, audit information provided on e-portals, and preliminary Overall Program Documents/Final Integrated Plans while identifying additional information necessary for the licensee to supplement its plan, and staff potential concerns.

In support of the ongoing audit of SNC's OIPs, as supplemented, the NRC staff conducted an onsite audit at Farley from December 7-10, 2015, as discussed in the audit plan dated October 21, 2015 (ADAMS Accession No. ML15289A065). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies order. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, and staging and deployment of offsite equipment. The enclosed audit report provides a summary of the activities for the onsite audit portion.

If you have any questions, please contact me at 301-415-1544 or by e-mail at Stephen.Monarque@nrc.gov.

Sincerely,


Stephen Monarque, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos.: 50-348 and 50-364

Enclosure:
Audit Plan

cc w/encl: Distribution via Listserv



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

AUDIT REPORT BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO ORDER EA-12-049 MODIFYING LICENSES
WITH REGARD TO REQUIREMENTS FOR
MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS
SOUTHERN NUCLEAR OPERATING COMPANY, INC.
JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 50-348 AND 50-364

BACKGROUND AND AUDIT BASIS

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Issuance of Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," and Order EA-12-051, "Issuance of Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation" (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12054A736 and ML12054A679, respectively). Order EA-12-049 directs licensees to develop, implement, and maintain guidance and 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). Order EA-12-051 requires, in part, that all operating reactor sites have a reliable means of remotely monitoring wide-range SFP levels to support effective prioritization of event mitigation and recovery actions in the event of a BDBEE. The orders require, in part, that all holders of operating reactor licenses and construction permits issued under Title 10 of the *Code of Federal Regulations* Part 50 to submit for review, Overall Integrated Plans (OIPs), including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

By letter dated February 27, 2013 (ADAMS Accession No. ML13059A387), Southern Nuclear Operating Company, Inc. (SNC, the licensee) submitted its OIP for Joseph M. Farley Nuclear Plant, Units 1 and 2 (Farley) in response to Order EA-12-049. By letters dated August 27, 2013, February 26, 2014, August 26, 2014, February 26, 2015, and August 27, 2015 (ADAMS Accession Nos. ML13240A240, ML14058B028, ML14239A291, ML15057A245, and ML15239B294, respectively), SNC submitted its first five six-month updates to the OIP. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the Farley interim staff evaluation (ISE) on January 17, 2014

Enclosure

(ADAMS Accession No. ML13337A584), and continues with in-office and onsite portions of this audit.

The licensee informed the NRC staff on June 26, 2015 (ADAMS Accession No. ML15182A175) and January 14, 2015 (ADAMS Accession No. ML15014A422) that it had achieved full compliance with the requirements of NRC Order EA-12-051 for Farley, Units 1 and 2, respectively. As such, the NRC staff did not perform an audit of the SFP instrumentation.

The ongoing audits allow the NRC staff to review open (OI) and confirmatory items (CI) from the mitigation strategies ISE, the licensee's integrated plans, and other audit questions (AQs). Additionally, the NRC staff gains a better understanding of submitted information, and updated information, audit information provided on e-portals, preliminary Overall Program Documents (OPDs)/Final Integrated Plans (FIPs), while identifying additional information necessary for the licensee to supplement its plan and address staff potential concerns.

In support of the ongoing audit of the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at Farley from December 7 - 10, 2015, as discussed in the audit plan dated October 21, 2015 (ADAMS Accession No. ML15289A065). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies order. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, and staging and deployment of offsite equipment.

Following the licensee's declarations of order compliance, the NRC staff will evaluate the OIPs, as supplemented, the resulting site specific OPDs/FIPs, and, as appropriate, other licensee submittals based on the requirements in the orders. For Order EA-12-049, the NRC staff will make a safety determination regarding order compliance using the Nuclear Energy Institute (NEI) developed guidance document NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," issued in August, 2012 (ADAMS Accession No. ML12242A378), as endorsed by NRC Japan Lessons-Learned Project Directorate (JLD) interim staff guidance (ISG) JLD-ISG-2012-01, "Compliance with Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events'" (ADAMS Accession No. ML12229A174), as providing one acceptable means of meeting the order requirements. For Order EA-12-051, the NRC staff will make a safety determination regarding order compliance using the NEI developed guidance document NEI 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12240A307), as endorsed, with exceptions and clarifications, by NRC ISG JLD-ISG-2012-03, "Compliance with Order EA-12-051, 'Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12221A339), as providing one acceptable means of meeting the order requirements. Should the licensee propose an alternative strategy or other method deviating from the guidance, additional NRC staff review will be required to evaluate the alternative strategy in reference to the applicable order.

AUDIT ACTIVITIES

The onsite audit was conducted at the Farley facility from December 7-10, 2015. The NRC audit team staff was as follows:

Title	Team Member
Lead Project Manager	Stephen Monarque
Technical Support	Michael Levine
Technical Support	Joshua Miller
Technical Support	Matthew McConnell

The NRC staff executed the onsite portion of the audit pursuant to the three part approach discussed in the October 21, 2015, plan, to include conducting a tabletop discussion of the site's integrated mitigating strategies (MS) compliance program, a review of specific technical review items, and discussion of specific program topics. Activities that were planned to support the above included detailed analysis and calculation discussions, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, and staging and deployment of offsite equipment.

AUDIT SUMMARY

1.0 Entrance Meeting (December 7, 2015)

At the audit entrance meeting, the NRC staff introduced itself followed by introductions from the licensee's staff. The NRC staff provided a brief overview of the audit's objectives and anticipated schedule.

2.0 Integrated Mitigating Strategies Compliance Program Overview

As an introduction to the site's program, SNC provided a presentation to the NRC staff titled "SNC NRC Audit Presentation." The licensee provided an overview of its strategy to maintain core cooling, containment, and SFP cooling in the event of a BDBEE, and the plant modifications being done in order to implement the strategies. The licensee also presented the location of the FLEX equipment storage facilities, the FLEX equipment that would be store there, the interface with the National SAFER Response Center (NSRC), the information regarding communications, and the access routes to the plant.

3.0 Onsite Audit Technical Discussion Topics

Based on the audit plan, and with a particular emphasis on Part 2 "Specific Technical Review Items," the NRC staff conducted interviews with SNC, conducted site walk-downs, and detailed the document review for the items listed in the plan.

3.1 Reactor Systems Technical Discussions and Walk-Downs

The NRC staff met with SNC staff to discuss the amount of leakage from the reactor coolant pump seals, reactor coolant system (RCS) makeup strategy, the availability of water sources, and the ability to remove heat from the RCS system via the steam generators. The NRC staff reviewed the analysis and flow calculations along with the procedures. The NRC staff also walked down SNC's strategies and reviewed plant procedures for implementing the core cooling and makeup strategies.

3.2 Electrical Technical Discussions and Walk-Downs

- a. The NRC staff reviewed the calculations and strategy regarding extending battery life based on load shedding. The NRC staff also walked down panels used for load shedding to evaluate feasibility and timing.
- b. The NRC staff walked the connection points and locations for FLEX electrical diesel generators (DGs). In order to support the licensee's Phase 2 strategy, one 600 Volt (V) DG will be deployed to supply power to both units. The licensee will have a second backup 600 V DG available. Additionally, one 480 V FLEX DG will be deployed to power the RCS makeup pumps. A second backup 480 V DG will be available. These four DGs will be stored in a Seismic Category 1 FLEX storage building on the Farley site. The NRC staff reviewed the licensee's load and sizing calculations for the FLEX generators.

3.3 Other Technical Discussion Areas and Walk-Downs

- a. The NRC staff reviewed the strategy that will be implemented by the licensee to refuel portable diesel-powered FLEX equipment. The NRC staff reviewed the instructions for refueling the equipment, as well as the equipment needed to perform the refueling. Additionally, the NRC staff reviewed the licensee's procedures for ensuring adequate fuel quality.
- b. The NRC staff reviewed SNC's plans to ensure adequate communications, lighting, and personnel access to successfully implement these strategies. The NRC staff observed communications features during the plant walkdown.
- c. The NRC staff toured the area where the FLEX storage building was located. This FLEX building is a concrete Seismic Category 1 building designed against all external hazards. The NRC staff walked down the FLEX equipment haul routes from the FLEX storage buildings to the designated deployment sites and walked down the haul routes from the designated staging areas for equipment that will be delivered from the NSRC.

4.0 Exit Meeting (December 10, 2015)

The NRC staff conducted an exit meeting with SNC following the closure of onsite audit activities. The NRC staff discussed the items that were reviewed and noted that the results of the onsite audit trip will be documented in this report.

CONCLUSION

The NRC staff completed all three parts of the October 21, 2015, onsite audit plan. Each audit item listed in Part 2 of the plan was reviewed by NRC staff members while on site. In addition to the list of NRC and licensee onsite audit staff participants in Attachment 1. Attachment 2 provides a list of documents reviewed during the onsite audit portion.

While this report notes the completion of the onsite portion of the audit as discussed in the audit plan dated October 21, 2015, the ongoing audit process continues as discussed in the letter dated August 28, 2013, to all licensees and construction permit holders for Order EA-12-049.

Additionally, the status and progress of the NRC staff's review may change based on licensee plan changes, resolution of generic issues, and other NRC staff concerns not previously documented. Changes in the NRC staff review will be communicated in the ongoing audit process.

Attachments:

1. NRC and Licensee Staff Onsite Audit Participants
2. Onsite Audit Documents Reviewed

Onsite Audit Participants

NRC Staff:

Matthew McConnell	NRR/JLD
Joshua Miller	NRR/JLD
Michael Levine	NRR/JLD
Stephen Monarque	NRR/JLD

Southern Nuclear Company and Support Staff:

Randy Bunt	SNC SAM Fleet Manager
Julie Collier	SNC Licensing Engineer
John Giddens	SNC Licensing Manager
Wendell Simmons	SNC Site Projects Supervisor
Aimee Gray	SNC-Maintenance Support Manager
Shannon Sampson	SNC-Radiation Protection Manager
Kayla D King	SNC – Flex Program Owner
Brad Osterbuhn	SNC-Flex License Renewal
Matthew R Euten	SNC- Licensing Engineer FLEX
John McLeon	SNC-Licensing Engineer
Barbara Taylor	SNC- Regulatory Affairs Manager
David Hall	SNC-EP Supervisor
Bryan Hess	Enercon – Mechanical Design Supervisor
Torun Robinson	SNC-Flex Engineer
Kenneth Buity	SNC-Site Design Manager
Steven Moynan	Enercon-Mechanical Engineer
Ugab Lee	Enercon-Mechanical Engineer
Garin Garb	SNC-Operations Outage Manager

Joseph M. Farley Nuclear Plant, Units 1 and 2

Documents Reviewed

SAFER Response Plan for Joseph M. Farley Nuclear Generating Station, Revision 001, dated September 8, 2015

NMP-OS-019-125 Farley Units 1 and 2 FSG-5, "Initial Assessment and FLEX Equipment Staging," Version 1.0 DRAFT

NMP-OS-019-059, "FLEX Support Building Operating Instruction," Version 1.0 DRAFT

Calculation SSM-SNC458207-002, Version 1.

Calculation SM-SNC458207-001

SM-SNC458207-007, "Class 1E Battery Hydrogen Generation after an Extended Loss of AC Power (ELAP)," Revision 2

Calculation A181153 "Flex Portable System Evaluation of O-site Diesel Fuel Consumption", Revision 2.0.

NMP-OS-019-157, "Diesel Fuel Oil Transfer" (SIG7), Version 1

NMP-OS-007-001, "Conduct of Operations Standards and Expectations," Version 14.3, dated April 11, 2014

Specification NO FHC-S-13-001/XIAR50 Version 1.0 Southern Nuclear Operating Company, Inc. "Procurement Specification for FLEX Equipment Storage Building for Alvin W Vogtle Electric Generating Plant - Units 1 and 2 Edwin I Hatch Nuclear Plant - Units 1 and 2 Joseph M. Farley Nuclear Plant – Units 1 and 2," dated December 9, 2013

FLEX Support Guideline (FSG), NMP-OS-019-101/121

FLEX Debris Removal Assessment for Farley Nuclear Plant, dated December 5, 2013

Calculation SM-SNC458207-004, "Farley Extended Loss of AC Power Decay Heat and Makeup Requirements," Version 1.0

A-181010, "Functional System Description Auxiliary Feedwater System," Section 3.10.2.6, Revision 35.0

Calculation SM-SNC 458207-004

NMP-OS-019-161, "Farley Unit S SIG-1, 600V Alternate Power," Revision Draft

NMP-OS-019-162, "Farley Unit S SIG-2, 480V Alternate Power," Revision 1

A1811108, "FLEX Portable System Phase 2 Core Cooling Subsystem"

SM-SNC458207-004

FLEX Engineering Judgment Report A181109, FLEX Options Beyond 24 Hours,

FSG-4, "ELAP DC Load Shed/Management," Revision 1

SE-SNC458207-001, "Auxiliary Building Battery LOSP Extended Coping Time Study," Revision 2

FSG-7, "Loss of Vital Instrumentation or Control Power," Revision 1

Farley Nuclear Plant Calculation SM-SNC458207

FSG-12, "Alternate Containment Cooling," Version 1.0, DRAFT

SIG-6, "Containment Integrity," Version 1.0, DRAFT

A-181127, "FLEX Portable System Phase 3 4160V Alternate Power Turbine Driven Generator Sizing," Revision 2

A-181126, "FLEX Portable System Phase 2 480V and 600V Alternate Power Diesel Generator Sizing," Revision 2

SNC467063E002 [Proposed], "J.M. Farley Nuclear Plant – Unit No. 1 - Single Line – Electrical Auxiliary System (Emergency 4160 & 600V)," Revision 1

SNC467063E003 [Proposed], "J.M. Farley Nuclear Plant – Unit No. 2 - Markup of Single Line – Electrical Auxiliary System (Emergency 4160 & 600V)," Revision 1

SNC467063E004 [Proposed], "Joseph M. Farley Nuclear Plant Unit No. 1 – Loads Diagram," Revision 1

SNC467063E005 [Proposed], "Joseph M. Farley Nuclear Plant Unit No. 2 – Loads Diagram (Emergency)," Revision 1

SNC467063E037 [Proposed], "J.M. Farley Nuclear Plant – Unit No. 1 & 2 – Wiring Diagram – 480V Power for FLEX Boron Injection and RCS Make Up Pump," Revision 1

Calculation SM-SNC458207-001, "Farley Main Control Room Heat up Evaluation during an Extended Loss of all AC Power", Version 2.0,

Calculation BM-96-1171-001

Calculation SM-SNC458207-005, Version 1.0,

(ADAMS Accession No. ML15182A175), and January 14, 2015 (ADAMS Accession No. ML15014A422), that it had achieved full compliance with the requirements of NRC Order EA-12-051 for Farley, Units 1 and 2, respectively, the NRC staff did not perform an audit of the spent fuel pool instrumentation.

The ongoing audit process allows the NRC staff to review open and confirmatory items from the mitigation strategies ISE, the licensee's integrated plan, and other audit questions. Additionally, the NRC staff gains a better understanding of submitted or updated information, audit information provided on e-portals, and preliminary Overall Program Documents/Final Integrated Plans while identifying additional information necessary for the licensee to supplement its plan, and staff potential concerns.

In support of the ongoing audit of SNC's OIPs, as supplemented, the NRC staff conducted an onsite audit at Farley from December 7-10, 2015, as discussed in the audit plan dated October 21, 2015 (ADAMS Accession No. ML15289A065). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies order. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, and staging and deployment of offsite equipment. The enclosed audit report provides a summary of the activities for the onsite audit portion.

If you have any questions, please contact me at 301-415-1544 or by e-mail at Stephen.Monarque@nrc.gov.

Sincerely,

/RA/

Stephen Monarque, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos.: 50-348 and 50-364

Enclosure:
Audit Plan

cc w/encl: Distribution via Listserv

DISTRIBUTION:

PUBLIC	RidsNRRDorLp12-1 Resource	SMonarque, NRR
JLD R/F	RidsNrrLASLent Resource	MLevine, NRR
RidsAcrsAcnw_MailCTR	BTitus, NRR	MMcConnell, NRR
RidsNrrPMFarley Resource	JMiller, NRR	

ADAMS Accession No. ML16014A734

* via email

OFFICE	NRR/JLD/JOMB/PM	NRR/JLD/LA	NRR/JLD/JERB/BC
NAME	SMonarque	SLent	Stewart Bailey
DATE	01/19/2016	01/19/2016	01/20/2016
OFFICE	NRR/JLD/JCBB/BC	NRR/JLD/JOMB/BC	NRR/JLD/JOMB/PM
NAME	Jessie Quichocho	Greg Bowman	SMonarque
DATE	01/22/2016	02/4/2016	02/8/2016

OFFICIAL RECORD COPY