



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

October 6, 2015

Site Vice President
Entergy Operations, Inc.
Waterford Steam Electric Station, Unit 3
17265 River Road
Killona, LA 70057-3093

**SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 - REPORT FOR THE
AUDIT REGARDING IMPLEMENTATION OF MITIGATING STRATEGIES AND
RELIABLE SPENT FUEL POOL INSTRUMENTATION RELATED TO ORDERS
EA-12-049 AND EA-12-051 (TAC NOS. MF0977 AND MF0946)**

Dear Sir/Madam:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "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 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 28, 2013 (ADAMS Accession No. ML13063A266), Entergy Operations, Inc. (Entergy, the licensee), submitted its OIP for Waterford Steam Electric Station, Unit 3 (Waterford), in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, February 26, 2015, and August 27, 2015 (ADAMS Accession Nos. ML13241A281, ML14059A085, ML14241A270, ML15057A548, and ML15239B353, respectively), Entergy submitted its first five successive 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 (NRR) Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the Waterford interim staff evaluation (ISE) dated November 22, 2013 (ADAMS Accession No. ML13220A402), and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13063A263), the licensee submitted its OIP for Waterford, in response to Order EA-12-051. By e-mail dated August 28, 2013 (ADAMS Accession No. ML13246A318), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 28, 2013, September 26, 2013, February 28, 2014, August 28, 2014, February 26, 2015, and August 27, 2015 (ADAMS Accession Nos. ML13241A280, ML13273A013, ML14059A087, ML14247A294, ML15057A555, and ML15239B357, respectively), the licensee submitted its RAI responses and first five successive six-month updates to the OIP. The NRC staff's review to date led to the issuance of

the Waterford ISE and RAI dated November 25, 2013 (ADAMS Accession No. ML13312A787). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

The ongoing audits allow the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted and 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 the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at Waterford from July 13 – 16, 2015, per the audit plan dated May 27, 2015 (ADAMS Accession No. ML15141A468). 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 and SFPI orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

The enclosed audit report provides a summary of the activities for the onsite audit portion. Additionally, this report contains an attachment listing all open audit items currently under NRC staff review.

If you have any questions, please contact me at 301-415-2833 or by e-mail at Peter.Bamford@nrc.gov.

Sincerely,

A handwritten signature in black ink that reads "Peter Bamford". The signature is written in a cursive, flowing style.

Peter Bamford, Senior Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosure:
Audit report

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 ORDERS EA-12-049 AND EA-12-051 MODIFYING LICENSES
WITH REGARD TO REQUIREMENTS FOR
MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS
AND RELIABLE SPENT FUEL POOL INSTRUMENTATION
ENTERGY OPERATIONS, INC.
WATERFORD STEAM ELECTRIC STATION, UNIT 3
DOCKET NO. 50-382

BACKGROUND AND AUDIT BASIS

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "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 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 28, 2013 (ADAMS Accession No. ML13063A266), Entergy Operations, Inc. (Entergy, the licensee), submitted its OIP for Waterford Steam Electric Station, Unit 3 (Waterford), in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, February 26, 2015, and August 27, 2015 (ADAMS Accession Nos. ML13241A281, ML14059A085, ML14241A270, ML15057A548, and ML15239B353, respectively), Entergy submitted its first five successive 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 (NRR) Office

Enclosure

Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the Waterford interim staff evaluation (ISE) dated November 22, 2013 (ADAMS Accession No. ML13220A402), and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13063A263), the licensee submitted its OIP for Waterford, in response to Order EA-12-051. By e-mail dated August 28, 2013 (ADAMS Accession No. ML13246A318), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 28, 2013, September 26, 2013, February 28, 2014, August 28, 2014, February 26, 2015, and August 27, 2015 (ADAMS Accession Nos. ML13241A280, ML13273A013, ML14059A087, ML14247A294, ML15057A555, and ML15239B357, respectively), the licensee submitted its RAI responses and first five successive six-month updates to the OIP. The NRC staff's review to date led to the issuance of the Waterford ISE and RAI dated November 25, 2013 (ADAMS Accession No. ML13312A787). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

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

In support of the ongoing audit of the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at Waterford from July 13 – 16, 2015, per the audit plan dated May 27, 2015 (ADAMS Accession No. ML15141A468). 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 and SFPI orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI 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 staff will make a safety determination regarding order compliance using the Nuclear Energy Institute (NEI) 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 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 staff will make a safety determination regarding order compliance using

the NEI guidance document NEI 12-02, Revision 1, "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 staff review will be required to evaluate if the alternative strategy complies with the applicable order.

AUDIT ACTIVITIES

The onsite audit was conducted at the Waterford facility from July 13 - 16, 2015. The NRC audit team staff was as follows:

Title	Team Member
Team Lead/Project Manager	Peter Bamford
Technical Support	Joshua Miller
Technical Support	Matthew McConnell
Technical Support	Kevin Roche
Technical Support	Khoi Nguyen

The NRC staff executed the onsite portion of the audit per the three part approach discussed in the May 27, 2015, plan, to include conducting a tabletop discussion of the site's integrated mitigating strategies 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; staging and deployment of offsite equipment; and physical sizing and placement of SFPI equipment.

AUDIT SUMMARY

1.0 Entrance Meeting (July 13, 2015)

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

2.0 Integrated Mitigating Strategies Compliance Program Overview

Per the audit plan and as an introduction to the site's program, the licensee provided a presentation to the NRC audit team titled "Waterford 3 Steam Electric Station, NRC FLEX Audit July 13 - 16, 2015." 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 an overview of the design and location of the FLEX equipment storage facilities, staging areas for equipment being delivered from the National SAFER Response Center (NSRC), and information regarding communications, procedures, and

training. The presentation included an overview of the spent fuel pool level indication modifications.

3.0 Onsite Audit Technical Discussion Topics

Based on the audit plan, and with a particular emphasis on the Part 2 “Specific Technical Review Items,” the NRC staff technical reviewers conducted interviews with licensee technical staff, site walk-downs, and detailed document reviews for the items listed in the plan. Results of these technical reviews that require additional information from the licensee or are still under NRC review are documented in the audit item status tables in Attachments 3 and 4, as discussed in the Conclusion section below.

3.1 Reactor and Balance-of-Plant Systems Technical Discussions and Walk-Downs

The NRC staff met with licensee staff to discuss the amount of leakage from the reactor coolant pump (RCP) seals, reactor coolant system (RCS) makeup strategy, the availability of water sources, and the ability to remove heat from the reactor coolant system via the steam generators. The staff also discussed provisions for SFP cooling (make-up and spray) with the licensee. The NRC staff reviewed the analysis and flow calculations along with applicable procedures. The NRC staff also walked down the licensee’s strategies and reviewed plant procedures for implementing core cooling, makeup, and SFP cooling 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, and walked down the battery rooms to evaluate strategies for hydrogen and temperature control. The NRC staff also walked down panels used for load shedding to evaluate feasibility and timing.
- b. The NRC staff walked down connection points and locations for FLEX electrical generators. In order to support the licensee’s strategy, one 480 volt electrical generator will be pre-installed in a new building located inside the flood protected area of the plant. The licensee will have a second backup (N+1) generator available. The staff reviewed the licensee’s load and sizing calculations for the FLEX generators.

3.3 SFPI Technical Discussions and Walk-Downs

The NRC staff walked down the instrument, transmitter, electronics, and display locations for the SFP level instrumentation, along with the associated cable runs. During the walk-down, one concern was identified. The cable conduits for both instrument channels were routed to a common area where they penetrate through the Fuel Handling Building (FHB) floor, separated by only six inches. This could leave both channels susceptible to a single event, such as a missile, compromising both circuits. In response to the staff’s concern, the licensee proposed a design change which includes installation of a protective barrier at the location where the two channels’ routing is in

close proximity. The NRC staff also reviewed the associated calibration, maintenance and test procedures for the SFP level instrumentation.

3.4 Other Technical Discussion Areas and Walk-Downs

- a. The NRC staff toured the areas where the “N” FLEX storage building was under construction and also where the “N+1” building is located. The “N” FLEX storage building is designed to provide protection and the ability to deploy equipment for all site hazards, whereas the “N+1” building is not. As described in the Waterford ISE dated November 22, 2013, and in the licensee’s third six-month status update for Order EA-12-049 dated August 28, 2014, this overall storage configuration is an alternative to NEI 12-06. The licensee has proposed alternative out-of-service requirements for equipment in the “N” building as a result. The location and strategy for FLEX storage is based primarily on a postulated flooding scenario which, for Waterford, has little or no warning time and an indefinite persistence. The NRC staff walked down equipment haul routes from the “N+1” FLEX storage building to the designated deployment sites, and walked down haul routes from designated staging areas for equipment that will be delivered from the NSRC in a non-flood scenario. For a flood scenario the licensee has made arrangements with the state of Louisiana Governor’s Office of Homeland Security and the Louisiana National Guard for helicopter deployment of NSRC equipment, relief personnel, and long-term supplies.
- b. The NRC staff walked down the FLEX strategies for core cooling, RCS inventory, and SFP inventory functions. This included the point of deployment for the portable FLEX pumps, hose routing and deployment connection points.
- c. The NRC staff reviewed the strategy that will be implemented by the licensee to refuel the 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 staff reviewed the licensee’s procedures for ensuring adequate fuel quality. Based on an NRC observation, the licensee initiated a corrective action to ensure that FLEX equipment fuel is sampled and maintained.
- d. The licensee’s cooldown strategy relies on operation of the steam generator atmospheric dump valves (ADV). The NRC staff reviewed the capability to operate the ADVs during an extended loss of alternating current (ac) power (ELAP).
- e. The NRC staff reviewed the licensee’s plans to ensure adequate communications, lighting, personnel access, and equipment access, to successfully implement the strategies. The NRC staff interviewed plant personnel responsible for these areas, and observed lighting and communication features during plant walk-downs.
- f. During the onsite audit, the NRC staff questioned whether portions of the Turbine-Driven Emergency Feedwater (TDEFW) steam supply piping, the TDEFW feedwater piping, and TDEFW exhaust lines, which are located outside of protected structures, meet the order requirement of reasonable protection from external events. The licensee stated that license amendment 168, approved by the NRC on September 7, 2000 (ADAMS Accession No. ML003749019), provides justification for

not affording protection for these lines and that this approval was applicable to Order EA-12-049 compliance. This license amendment justified leaving certain plant features unprotected from tornado missiles, based on a probabilistic analysis utilizing the TORMIS methodology. The NRC staff disagreed with the licensee's assertion that the TORMIS analysis, by itself, demonstrates reasonable protection for Order EA-12-049, since the applicable features remain unprotected. Based on this feedback, the licensee is developing a supplemental evaluation, informed, in part, by the TORMIS analysis that establishes reasonable assurance of the availability of these plant features after a postulated high-wind event at Waterford.

- g. During the on-site audit the NRC staff noted that the licensee did not have provisions for SFP spray in Phase 2 of the strategy. The NRC staff position is that not having spray capability does not meet the provisions of NEI 12-06, Revision 0, and is therefore an alternative. The licensee is working on developing a modified strategy to address this concern.
- h. During the on-site audit the NRC staff noted that the licensee's strategy depends on a single suction source and connection point for the FLEX core cooling pump and the Component Cooling Water (CCW) makeup pumps (used for spent fuel pool cooling) from the wet cooling tower (WCT) basin. The NRC staff considers this to be an alternative to NEI 12-06. The licensee is working on providing justification for the alternative.

4.0 Exit Meeting (July 16, 2015)

The NRC staff audit team conducted pre-exit and exit meetings with licensee staff following the completion of the onsite review activities. The NRC staff highlighted items still under review and noted that the results of the onsite audit trip will be documented in this report. Items that require additional information from the licensee or are still under NRC review are detailed in Attachments 3 and 4 of this report.

CONCLUSION

The NRC staff completed all three parts of the May 27, 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.

In support of the continuing audit process, as the licensee proceeds towards orders compliance for this site, Attachments 3 and 4 provide the status of all open audit review items that the NRC staff is evaluating in anticipation of issuance of a combined SE for both the mitigation strategies (MS) and SFPI orders. These attachments include items remaining from the onsite audit, as well as any items that are being reviewed exclusively in the NRC offices, or have been added since the onsite audit. The five sources for the audit items referenced below are as follows:

- a. MS ISE open Items (OIs) and confirmatory items (CIs)
- b. MS audit questions (AQs)

- c. Licensee-identified OIP Open Items
- d. SFPI RAIs
- e. Additional safety evaluation (SE) needed information

While this report notes the completion of the onsite portion of the audit per the audit plan dated May 27, 2015, the ongoing audit process continues, as per letters dated August 28, 2013, and March 26, 2014, to all licensees and construction permit holders for both orders.

Additionally, while Attachments 3 and 4 provide a progress snapshot of the NRC staff's review of the licensee's OIPs, as supplemented, and as augmented in the audit process, 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
3. Waterford MS/SFPI SE Audit Items currently under NRC staff review and requiring licensee input
4. Waterford MS/SFPI SE Audit Items currently under NRC staff review but not requiring licensee input

Onsite Audit Participants

NRC Staff:

Peter Bamford	NRR/JLD/JOMB
Joshua Miller	NRR/JLD/JERB
Kevin Roche	NRR/JLD/JCBB
Khoi Nguyen	NRR/JLD/JERB
Matthew McConnell	NRR/JLD/JERB

Waterford Staff:

Alan Harris	Licensing
Brian Lanka	Engineering Director
David Viener	FLEX Engineering Lead
JR Maynard	Operations
Gene Wemett	Operations
Danny Raines	Project Manager
Jacob Champagne	Design Engineering (SFPLI)
Bob Carey	Emergency Preparedness Manager
Curtis Plumlee	Senior Project Manager
Greg Fey	Emergency Preparedness/Logistics
Leia Milster	Licensing
John Signorelli	Training
Andrew Jones	Enercon
Matthew Rohrer	Corporate
Victor Collins	Operations (Procedures)
Dale Gallodoro	Design Engineering (Mechanical)
William McDonald	Design Engineering (Electrical)

Documents Reviewed

FLEX Guidelines

FLEX Implementing Guideline (FIG) FIG-001, "Extended Loss of AC Power," Draft Rev. 0

FLEX Support Guideline (FSG) FSG-002, "Alternate EFW Suction Source," Draft Rev. 0

FSG-004, "ELAP DC Bus Load Shed and Management," Draft Rev. 0

FSG-005, "Initial Assessment And FLEX Equipment Staging," Draft Rev. 0

FSG-007, Loss of Vital Instrumentation or Control Power," Draft Rev. 0

FSG-011, "Alternate SFP Makeup and Cooling," Draft Rev. 0

Procedures

EN-FAP-EP-010, "Severe Weather Response," Rev. 1

EN-OP-115-01, "Operator Rounds," Rev. 0

OP-902-005, "Station Blackout Recovery," Rev. 18

OP-901-521, "Severe Weather and Flooding," Rev. 315

OI-042-000, "Watchstanding Processes," Rev 36

OP-901-211, Generator Malfunction, Rev. 8

EN-RE-220, "PWR Control of Miscellaneous Material in the Spent Fuel Pool," Rev. 3

EN-RP-123, "Radiological Controls for Highly Radioactive Objects," Rev. 1

NE-001-005, "Preparation, Control and Documentation of Fuel Movement," Rev. 29

Calculations/Analyses

CN-SEE-13-3, "Waterford Steam Electric Station Unit 3 Reactor Coolant System Inventory, Shutdown Margin, and Modes 5 and 6 Boric Acid Precipitation Control Analyses to Support the Diverse and Flexible Coping Strategies (FLEX)," Rev. 2

ECC14-002, "WF3 SFPI Electrical Equipment Support Qualification," Rev. 0

ECC14-003, "SFPI Mounting Bracket Design," Rev. 0

ECC 14-024, "FLEX Diesel Generator Anchorage," Rev. 0

ECC 14-028, "FLEX Equipment Anchorage in RAB," Rev. 0

ECC 14-030, "FLEX Cable Reel Storage Rack Analysis and Support Calculation," Rev. 0

ECC 14-033, "FLEX Non-Collapsible Hose Storage Rack Design and Support Calculation," Rev. 0

ECC 14-039, "Sliding and Rocking Evaluation of FLEX N+1 Storage Building Equipment," Rev. 0

ECC 14-051, "FLEX Diesel Fuel Pump Transfer Pump Support Calculation," Rev. 0

ECE 14-003, "FLEX Strategy – Portable Diesel Generator Sizing," Rev. 0

ECE 14-004, "3A-S 'A' Train Calculation for FLEX Event," Rev. 1

ECE 14-005, "3B-S 'B' Train Calculation for FLEX Event," Rev. 1

ECM 14-003, "FLEX Water Transfer Pump Sizing," Rev 0

ECM 14-005, "FLEX Core Cooling Pump Sizing," Rev. 0

ECM 14-006, "FLEX Diesel Fuel Oil Transfer Pump Sizing Calculation," Rev. 0

ECM 14-009, "NPSH Available for the TDEFW, FCCP and CCWMUP," Rev 0.

ECS 14-002, "WF3 FLEX Main Control Room BDBEE Heat-up Analysis," Rev. 1

ECS 14-003, "WF3 FLEX Reactor Auxiliary Building -35' Elevation BDBEE Heat-up Analysis," Rev. 1

ECS 14-004, "WF3 FLEX Switchgear and DC Equipment Rooms BDBEE Heat-up Analysis," Rev. 0

ECS14-006, "WF3 FLEX Use of Borated Water for Steam Generator Make-up," Rev. 0

Drawings

SK-ENTGWF085-E-001, "Phase 2: Diverse 480VAC Connections," Rev. 0

LOU-1564B-289, Sheet 15, "Power Distribution and Motor Data 4.16 kV SWGR 3A3-S One Line Diagram," Rev. 10

LOU-1564B-289, Sheet 16, "Power Distribution and Motor Data 4.16 kV SWGR 3B3-S One Line Diagram," Rev. 11

CS-15-00008, "FLEX Phase 3 Coping Strategy Equipment Staging Arrangement," Rev. 0

B-288, Sheet 18B, "Cable and Conduit List Installation Details, Conduit Seismic Support Chart," Rev. 0

B-424, Sheet 3079, "Control Wiring Diagram Spent Fuel Pool Instrumentation Channel #1," Rev. 0

B-424, Sheet 3080, "Control Wiring Diagram Spent Fuel Pool Instrumentation Channel #2," Rev. 0

B356, Sheet 313, "Lighting Panel Details," Rev. 21

B289, Sheet 67, "Power Distribution and Motor Data 480 MCC 3B311-S1 One Line Diagram," Rev. 16

B356, Sheet 312, "Lighting Panel Details," Rev. 17

B289, Sheet 63, "Power Distribution and Motor Data 480 MCC 3A311-S One Line Diagram," Rev. 13

B288, "Cable and Conduit List Installation Notes," Sheet 4, "Conduit Installation Notes & Underground Concrete Encased CNDTS," Rev. 18

Other Documents

LTR-LIS-14-79, "Generic Information to Support Requests for Additional Information in USNRC Reviews of FLEX Overall Integrated Plans with Regard to Reflux Cooling and Boron Mixing for PA-ASC-1187," Rev. 0

WF3-SA-14-00002, "Waterford 3 FLEX Strategy Development," Rev. 0

Waterford 3 Steam Electric Station Unit 3 Final Safety Analysis Report (FSAR), Rev. 308

Action Request (AR) 230293 (EC55190), "Ensure Future Core Reloads Consider Shutdown Margins Considered in FLEX Analyses"

Condition Report (CR), CR-WF3-2015-04478, Corrective Actions 2 - 5

Licensing Request LR-LAR-2014-00287, Action 4

Engineering Change (EC) 51387, "FLEX Pre-Staged Equipment Storage," Rev. 0

EC 48147, "Spent Fuel Pool Level Instrumentation," Rev. 0

EC 51386, "FLEX 'N+1' Storage," Rev. 0

EC 47846, "Fukushima E-Plan Communications," Rev. 0

Engineering Change Notice (ECN) 53374, Rev. 0

AREVA Doc 51-9237998-00, "Waterford 3 Steam Electric Station SAFER Response Plan," Draft Rev. 0, dated 5/26/15

"Memorandum of Understanding Between Entergy Nuclear Operations Inc., The Louisiana's Governor's Office of Homeland Security and the Louisiana National Guard," DRAFT, dated March 2015

"Input for Mission Script Waterford 3 Emergency Response for Beyond Design Basis External Event FLEX Phase 3"

"Waterford 3 Emergency Planning Desk Guide, Administrative Logistics Coordinator," Rev. 11

"FLEX N+1 Storage Building Design Requirements Document," Rev. 0, dated August 15, 2014

W3-DBD-007, "Chemical and Volume Control System," Rev. 301

4Q-C-2P1, "EBASCO Interoffice Correspondence, Louisiana Power & Light Company Waterford SES Unit No. 3 Charging Pump Packing Cooling and Lubricating," dated 9/9/86

MOHR Test Report NAI-1725-004, "Seismic Induced Hydraulic Response in the CGS Spent Fuel Pool"

MOHR Test Report 1-0410-6, "MOHR EFP-IL SFPI System Seismic Test Report"

MOHR Test Report 1-0410-9, "MOHR SFP-1 Level Probe Assembly Seismic Analysis Report"

G-M0001, "Radiation and Temperature Charts Table II and III, Figure B1.a, B1.b, & B1.c," Rev. 4

G-M-0012, "Environmental Zone Map Radiation Reactor Bldg. Plan EL. +21, Figure B-4," Rev. 3

G-M0001, "Radiation and Temperature Charts Table II and III, Figure B1.a, B1.b, & B1.c,"
Rev. 4

G-M-0004, "Environmental Zone Map T.P.H.C.S Reactor Bldg. Plan EL. +21, Figure B-4,"
Rev. 2

EN-DC-324, "Preventative Maintenance Program," Rev. 15

Waterford
Mitigation Strategies/Spent Fuel Pool Instrumentation Safety Evaluation Audit Items:

Audit Items Currently Under NRC Staff Review and Requiring Licensee Input

Audit Item Reference	Item Summary Description	Licensee Input Needed
OI 3.2.4.2.B	Battery Room Ventilation	Complete an analysis to ensure that the temperature in the battery rooms remains below the qualification limits for the batteries. The same concern needs to be addressed for the static uninterruptible power supply (UPS) and battery chargers. Describe how procedural actions are consistent with assumptions of the analysis. After completion of the analysis, update the response item, and make the analysis and procedures available for NRC review on the e-portal.
CI 3.1.1.3.A	Internal Flooding	Complete internal flood analysis and make available for NRC review on the e-portal.
AQ.24	Exposed piping associated with TDEFW pump	Complete a supplemental evaluation (beyond existing TORMIS analysis) establishing adequate protection for TDEFW steam supply lines, feed lines, and exhaust piping exposed to outside. This evaluation needs to be submitted for NRC review or captured in a formal analysis and made available on the e-portal. Either the evaluation or a reference to the formal calculation needs to be docketed.
SE.3	FLEX program document	Develop program document and make available for NRC staff review on the e-portal
SE.7	Operating Experience - Recent MOHR SFPI equipment failures	Describe any actions/measures Waterford plans to implement to address this operating experience. Provide vendor information on the replacement parts' qualifications. Make responses and vendor reports available on e-portal for NRC review.
SE.8	Environmental qualification of containment electrical equipment, as well as the atmospheric relief valves, showing that the equipment will be functional for the ELAP mission time.	Perform evaluation and make available for NRC staff review on the e-portal.
SE.18	Use of installed spent fuel pool cooling pumps	Provide capability for SFP spray consistent with the provisions of NEI 12-06
SE.24	Guidance for transitioning from Phase 2 diesel generators to Phase 3 turbine generators	Provide strategy to transition to Phase 3 equipment under flooding conditions and make available for NRC staff review on the e-portal.

Audit Item Reference	Item Summary Description	Licensee Input Needed
SE.25	New "N" storage building located on top of existing structure	Provide an evaluation for the robustness of the "N" storage building and the room beneath where a FLEX electrical connection panel is located and make available for NRC staff review on the e-portal.
SE.26	SFPI cable conduits located side-by-side for a portion of the routing inside the FHB	Provide completed design that includes protection to this portion of the conduit routing as described to the NRC staff during the on-site audit.
SE.27	Single WCT outlet and connection point.	Provide justification for the alternative.

Waterford
Mitigation Strategies/Spent Fuel Pool Instrumentation Safety Evaluation Audit Items:

Audit Items Currently Under NRC Staff Review, But Not Requiring Further Licensee Input

Audit Item Reference	Item Description	Action
CI 3.2.3.A	Final containment analysis	NRC to review calculation ECS14-001.

the Waterford ISE and RAI dated November 25, 2013 (ADAMS Accession No. ML13312A787). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

The ongoing audits allow the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted and 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 the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at Waterford from July 13 – 16, 2015, per the audit plan dated May 27, 2015 (ADAMS Accession No. ML15141A468). 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 and SFPI orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

The enclosed audit report provides a summary of the activities for the onsite audit portion. Additionally, this report contains an attachment listing all open audit items currently under NRC staff review.

If you have any questions, please contact me at 301-415-2833 or by e-mail at Peter.Bamford@nrc.gov.

Sincerely,

/RA/

Peter Bamford, Senior Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No. 50-382
Enclosure: Audit report
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OFFICE	NRR/JLD/JOMB/PM	NRR/JLD/LA	NRR/JLD/JCBB/BC(A)
NAME	PBamford	SLent	BTitus
DATE	9/29/15	9/30/15	10/5/15
OFFICE	NRR/JLD/JERB/BC	NRR/JLD/JOMB/BC(A)	NRR/JLD/JOMB/PM
NAME	SBailey	MHalter	PBamford
DATE	10/6/2015	10/6/2015	10/6/2015