



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

June 12, 2015

Mr. Richard M. Glover, Site Vice President
H.B. Robinson Steam Electric Plant
Duke Energy
3581 West Entrance Road
Hartsville, SC 29550

SUBJECT: H.B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 – REPORT FOR THE
ONSITE AUDIT REGARDING IMPLEMENTATION OF MITIGATING
STRATEGIES AND RELIABLE SPENT FUEL INSTRUMENTATION RELATED
TO ORDERS EA-12-049 AND EA-12-051 (TAC NOS. MF0720 AND MF0793)

Dear Mr. Glover:

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 26, 2013 (ADAMS Accession No. ML13071A415), Duke Energy Progress, Inc. (Duke, the licensee) submitted its Overall Integrated Plan (OIP) for H.B. Robinson Steam Electric Plant, Unit No. 2 (Robinson) in response to Order EA-12-049. By letters dated August 28, 2013, February 24, 2014, August 26, 2014, and February 23, 2015 (ADAMS Accession Nos. ML13252A243, ML14063A283, ML14253A161, and ML15065A041, respectively), Duke submitted its first four 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 Robinson interim staff evaluation (ISE) (ADAMS Accession No. ML13365A291) on February 19, 2014, and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13086A096), the licensee submitted its OIP for Robinson in response to Order EA-12-051. By letter dated July 11, 2013 (ADAMS Accession No. ML13189A056), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 8, 2013, August 26, 2013, February 24, 2014, August 26, 2014, and February 23, 2015 (ADAMS Accession No. ML13233A313, ML13242A010, ML14063A604, ML14251A013, ML15082A016, respectively), the licensee submitted its RAI responses and first four six-month updates to the OIP. The NRC staff's review of these submittals led to the issuance of the Robinson ISE and RAI dated November 19, 2013 (ADAMS Accession No. ML13273A481). 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 ePortals, 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 Robinson from March 2-6, 2015, per the audit plan dated January 28, 2015 (ADAMS Accession No. ML15020A388). 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.

R. Glover

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If you have any questions, please contact me at 301-415-5888 or by e-mail at Jason.Paige@nrc.gov.

Sincerely,

A handwritten signature in black ink, consisting of a large loop followed by a series of strokes that form the letters 'J', 'C', 'P', and 'M'.

Jason C. Paige, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No.: 50-261

Enclosure:
Audit report

cc w/encl: Distribution via Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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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
DUKE ENERGY PROGRESS, INC.
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261

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 [BDBEE]" 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.

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Enclosure

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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 ePortals, 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 Robinson from March 2-6, 2015, per the audit plan dated January 28, 2015 (ADAMS Accession No. ML15020A388). 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 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 Robinson facility from March 2, 2015, through March 6, 2015. The NRC audit team staff was as follows:

Title	Team Member
Team Lead / Project Manager	Jason Paige
Technical Support	Garry Armstrong
Technical Support	Kerby Scales
Technical Support	Joshua Miller

The NRC staff executed the onsite portion of the audit per the three part approach discussed in the January 28, 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 (March 2, 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 "RNP [Robinson Nuclear Plant] 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. Also presented was the design and location of the FLEX equipment storage facility, the FLEX equipment that would be stored there, the interface with the National SAFER Response Centers (NSRCs), and the spent fuel pool level indication modification.

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 review for the items listed in the plan. Results of these technical reviews that require additional information from the

licensee or 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 Systems Technical Discussions and Walk-Downs

The NRC staff reviewed Robinson's modeling of an extended loss of all alternating current (ac) power (ELAP) and its ability to mitigate the event, including the computer code NOTRUMP used for the ELAP analysis and input parameters assumed to generate the results of the analysis. The licensee provided a table comparing the WCAP-17601-P, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs," generic analysis values to the Robinson specific plant values. The staff noted differences between the WCAP-17601-P and plant specific calculations, including a lower Tave value at Robinson, lower initial power level, and differences in the accumulator size, liquid volume, and pressure. To justify the differences, the licensee is installing shield shutdown seals. The licensee stated that the seal leakage for Robinson is significantly less than in the generic NOTRUMP case and provides the margin to bound these differences.

3.2 Electrical Technical Discussions and Walk-Downs

The NRC staff reviewed Robinson's FLEX diesel generator (DG) sizing calculations, manufacturer specifications, and FLEX Support Guidelines (FSGs) to confirm that they are of sufficient capacity to supply the expected loads. The licensee plans to utilize 120VAC and 480VAC FLEX DGs for Robinson as part of its Phase 2 mitigating strategy during an ELAP event as a result of a BDBEE. The design rating for the 120 volt ac (VAC) and 480VAC FLEX DGs is 6 kilowatts (kW) and 150kW, respectively. For Robinson, the total loads for the 480VAC DG is 134kW. The licensee plans to receive a 1 megawatt, 480VAC FLEX DG from the SAFER Response Center as part of its Phase 3 mitigating strategy, but they plan to cope indefinitely with the Phase 2 pre-staged FLEX DG.

In addition, the NRC staff walked down the Phase 2 FLEX DG pre-staging location (Reactor Auxiliary Building (RAB) Solid Radioactive Waste Drumming Room), Phase 3 SAFER FLEX staging location (east side of radwaste building), switchgear rooms, and reviewed single line diagrams showing connection points for FLEX equipment. The licensee provided a white paper discussing Robinson's position regarding permanently pre-staging their two 480 VAC FLEX DGs. The licensee discusses this as an alternate strategy and the advantages that outweigh the lack of portability of the pre-staged FLEX DGs.

3.3 SFPI Technical Discussions and Walk-Downs

The NRC staff walked down the SFP area, SFPI locations, and related equipment mounting areas. No concerns were identified during the walk-downs.

3.4 Other Technical Discussion Areas and Walk-Downs

- a. The NRC staff reviewed the licensee's strategy to use the steam generator (SG) power operated relief valves (PORVs) to cool the reactor coolant system (RCS), the motive force to actuate the PORVs, and the protection of the PORVs from external events. The licensee indicated that the SG PORVs have an installed backup nitrogen source that is protected from tornado events due to its location in the turbine building. The licensee provided an existing strategy to supply a portable nitrogen source at the SG PORVs in procedure EDMG-004, Attachment 1, "Connecting Emergency Pressure Source to Operate SG PORVs." In addition, the licensee provided an engineering evaluation, which evaluates the hardening of the Turbine Building Class 1 Bay to protect the SG PORVs. The licensee also indicated that the actual primary strategy to cooldown the RCS will be using the main steam line isolation valve (MSIV) bypass lines. The strategy is detailed in calculation RNP-M/MECH-1712, Appendix R Mechanical Basis Calculation, Section 3.27, "Cooldown Using MSIV Bypass Lines." The strategy is proceduralized in ECA-0.0, "Loss of All AC Power", Attachment 4, Local Control of SG Level and Pressure. The staff reviewed the above documents to confirm that the licensee has identified protection for the PORVs and MSIV valves from external hazards for operation after an ELAP.
- b. The NRC staff reviewed the configurations of the steam driven auxiliary feedwater (SDAFW) pump steam traps and mini-flow recirculation line to confirm that the pump will not be rendered inoperable if the lines are damaged. The licensee indicated that the steam traps on the main steam piping supplying shell warming steam, gland seal steam, and main steam to the pump's turbine are located in close vicinity to the SDAFW pump. The pump and steam traps are located inside the turbine building Class I bay. The structure is Seismic Class I and provides protection from natural hazards, such as earthquake and tornado generated missiles. The licensee indicated that the steam traps will be protected inside the turbine building Class I bay.

The licensee also indicated that the minimum flow line for the SDAFW pump is Class III piping from the pump discharge to the pressure drop orifice. This piping section is located in the turbine building Class I Bay and is protected from damage due to natural hazards. The piping downstream of the orifice is non-safety related and is exposed to seismic and tornado generated missile damage. However, a break in the non-safety related portion of the pipe will not impact SDAFW pump operability or flow to the SGs due to this section of the piping being able to be isolated.

- c. The NRC staff reviewed the licensee's assessment of battery room hydrogen accumulation due to loss of the heating, ventilation and air conditioning (HVAC) system during an ELAP event. In addition, the NRC staff walked down surrounding rooms, including the batching tank room and the E1/E2 switchgear room to verify that hydrogen gas accumulation in the 125 V direct current (dc) vital battery room will not reach combustible levels while HVAC is lost during an ELAP. The minimal amount of hydrogen generated during the initial period when the batteries are discharged will be dissipated upon opening doors, which operators are directed to do in the FSGs to run cables to connect the FLEX DGs. The doors to the drumming room, batching tank room, and battery room will be opened and provide a ventilation pathway for the battery room. The licensee evaluated the hydrogen generation and determined that hydrogen

concentration doesn't exceed 1% when charging begins at 1 hour into the ELAP and the doors mentioned above are opened.

- d. The NRC reviewed the alternate sources of cooling water and the potential impacts of reduced water quality. The licensee indicated that Westinghouse performed an evaluation for utilizing the alternate sources (Lake Robinson, cooling water inlet bay, all site deepwells) for makeup to the SGs and RCS and prioritized the different sources. The evaluation concluded that after utilizing the condensate storage tank (CST), or if the CST is unavailable after the external hazard event, the preference would be to use the 6 FLEX AFW tanks which contain 120,000 gallons. After exhausting the 6 AFW tanks, the deep well water sources would be available for makeup at least 700 hours before fouling and heat transfer become untenable, assuming current chemistry conditions exist. The evaluation also made an assumption that the lake and cooling water inlet bay could become agitated as a result of an external event and total suspended solids could increase significantly. Applying this assumption resulted in an approximately 283 hour coping time for the lake and cooling water inlet bay in the worst case condition if the deep wells are unavailable.

Additionally, the licensee stated that in Phase 3 strategy there will be sufficient time to deploy a water treatment system from the NSRCs to condition the lake or cooling water discharge water for extended coping to allow for recovery planning. The licensee also referenced FSG-003, "Alternate Low Pressure Feedwater," which describes the transition from directly using the lake water for makeup and filtering through the NSRC water filtration system as directed in FSG-015, "Water Management."

- e. The NRC staff reviewed the licensee's fuel strategy. The licensee plans to fully fuel all FLEX equipment. Initial diesel for refuel of the running equipment will come from two 500 gallon diesel fuel trailers that will be stored in the FLEX Storage Facility that is protected from all applicable hazards. Additional fuel will be available from the Alternate Fuel Oil Storage Tanks (AFOST) located on the third floor of the radwaste building in a robust area, which holds about 3000 gallons of fuel. Fuel will be gravity drained from the tanks to refill the diesel fuel trailers. This source is protected from high winds and missile hazards. The licensee also identified additional fuel that can also be gravity drained or pumped through the pump on the refueling trailers from the Diesel Fuel Oil Storage Tank (DFOST) (over 19,000 gallons) to the diesel fuel trailers. This source is robust for seismic hazards. Additional fuel can also be gravity drained or pumped through the pump on the refueling trailers from the Internal Combustion Turbine fuel tanks (ICT) (over 14,000 gallons) to the diesel fuel trailers. This source is not robust against all hazards. The staff walked down the fuel storage locations to confirm the surrounding environment for the applicable external hazards. Based on the various locations of the fuel oil on site, the licensee can access fuel from protected locations based on the specific external hazard between seismic and high winds/tornado. If necessary, the licensee also specified that fuel can be provided onsite within 8 hours to refuel the surviving fuel storage tanks.

4.0 Exit Meeting (March 6, 2015)

The NRC staff audit team conducted an exit meeting with the licensee staff following the closure of onsite audit activities. The NRC staff highlighted items reviewed and noted that the results of the onsite audit trip will be documented in this report. The following items that require additional information from the licensee or still under NRC review were discussed at the exit meeting (see Attachments 3 and 4 for additional information):

a. ISE CI 3.1.5.2.A and ISE CI 3.2.4.2.A, Heat-Up Calculations

The NRC staff requested that the licensee confirm that actions necessary to ensure equipment functionality and personnel habitability during an ELAP event are appropriately incorporated into the FLEX strategies, based on the analyses of the impact of high temperatures on various areas/compartments. The licensee made available a calculation to confirm the requested information, and the NRC staff is currently reviewing the calculation.

b. ISE CI 3.2.1.B and AQ 61, Steam Generator Dryout

The NRC staff requested that the licensee address each of the 7 Pressurized-Water Reactor Owners Group (PWROG) recommendations listed in Section 3.2 of WCAP-17601-P. The licensee is using the WCAP value for SG dryout of 61 minutes. A plant specific calculation completed by the licensee shows that SG dryout for Robinson occurs within 35.7 minutes with low SG water level. If the nominal water level is used, the licensee showed a SG dryout value of 64 minutes. (88641 lbms vs 66481 lbms). Using the generic value is conservative with 3 minutes of margin to the hand calculation provided. The plant specific calculation assumes 102 percent power. The staff is currently reviewing the SG dryout calculations.

In addition, the NRC staff expressed concern regarding the timeliness of the operator being able to complete the FLEX pump connection after addressing any possible debris and/or flooding concerns in the cooling water inlet bay. This is a time sensitive action that must be completed before SG dryout occurs. Therefore, the NRC staff requested that the licensee make available an engineering evaluation of potential debris in the area near the cooling water inlet bay and the time validation of performing the connection to the FLEX pump for SG makeup.

c. ISE CI 3.2.3.A, AQ 19, AQ 20, Containment Analysis

The NRC staff requested that the licensee make available a containment temperature and pressure analysis to confirm that the Robinson strategy maintains containment. The licensee made available a calculation to confirm the requested information, and the NRC staff is currently reviewing the calculation.

CONCLUSION

The NRC staff completed all three parts of the January 28, 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 safety evaluation (SE) for both the Mitigation Strategies (MS) and Spent Fuel Pool Level Instrumentation (SFPLI) orders. The five sources for the audit items referenced below are as follows:

- a. Interim Staff Evaluation (ISE) Open Items (OIs) and Confirmatory Items (CIs)
- b. Audit Questions (AQs)
- c. Licensee-identified Overall Integrated Plan (OIP) Open Items (OIs)
- d. SFPLI Requests for Additional Information (RAIs)
- e. Additional SE needed information

The attachments provide audit information as follows:

- a. Attachment 1: List of NRC staff and licensee staff audit participants
- b. Attachment 2: List of documents reviewed during the onsite audit
- c. Attachment 3: Robinson MS/SFPI SE Audit Items currently under NRC staff review and requiring licensee input as delineated
- d. Attachment 4: Robinson MS/SFPI SE Audit Items currently under NRC staff review but not requiring further licensee input

While this report notes the completion of the onsite portion of the audit per the audit plan dated January 28, 2015, the ongoing audit process continues as per the 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.

Lastly, the licensee has identified open items that need to be completed to implement Orders EA-12-049 and EA-12-051, and the staff expects that the licensee continue to provide updates on the status of the licensee identified open items in their 6-month updates or on the ePortal.

Attachments:

- 1. NRC and Licensee Staff Onsite Audit Participants
- 2. Onsite Audit Documents Reviewed
- 3. Robinson MS/SFPI SE Audit Items currently under NRC staff review and requiring licensee input
- 4. Robinson MS/SFPI SE Audit Items currently under NRC staff review but not requiring further licensee input

Onsite Audit Participants

NRC Staff:

Jason Paige	NRR/JLD/JOMB
Garry Armstrong	NRR/JLD/JCBB

Kerby Scales	NRR/JLD/JERB
Joshua Miller	NRR/JLD/JERB

Robinson Staff:

R. Michael Glover	Site Vice President
Eric Hedderman	Chemistry Manager
Tom Kirwin	Maintenance Manager
Chuck Sherman	RP Manager
Keith Holbrook	Operations Manager
John Kunzmann	Design Engineer, Director
Jeff West	Engineering, Manager
Steve Callis	Fukushima Licensing Engineer
Sharon Peavyhouse	Organizational Effectiveness, Director
David Hoffman	Nuclear Oversight, Manager
Richard Hightower	Regulatory Affairs, Manager
Henry Curry	Training, Manager
Charles Arbuthnot	Fleet FRO Equipment
David Llewellyn	Fleet Fukushima Response, Director
Warren Farmer	Major Projects Interface
Art Musselwhite	FRO
Mark Van Sicklen	FRO
Guy Levy	FRO
Larry Smith	Operations
Paul Guill	Fleet FRO
Scott Connelly	Regulatory Affairs

Documents Reviewed

- Procedure FSG-004, ELAP DC Load Shed/Management, Rev. 0
- Procedure FSG-005, Initial Assessment and FLEX Equipment Staging, Rev. 0
- Procedure FSG-014, Electrical Power Restoration, Rev. 0
- Procedure EDMG-004, Attachment 1, Connecting Emergency Pressure Source to Operate SG PORVs
- Engineering Change (EC) 90627, Turbine Building Hardening
- Calculation RNP-M/MECH-1712, Cooldown Using MSIV Bypass Lines
- Procedure ECA-0.0, Loss of All AC Power
- Calculation RNP-M/MECH-1878, Hydraulic Analysis to Support Fukushima FLEX 4.2 Strategy for AFW System
- Calculation RNP-M/MECH-1896, Hydraulic Analysis to Support Fukushima FLEX 4.2 Strategy for Supplying Alternate Feed to AFW via the CW System
- Procedure FSG-002, Alternate AFW Suction Source
- Procedure FSG-003, Alternate Low Pressure Feedwater
- Procedure FSG-006, Alternate CST Makeup
- Calculation RNP-M/MECH-1880, Hydraulic Analysis to Support Fukushima FLEX 4.2 Strategy for SIS System
- Calculation RNP-M/MECH-1893, Pressure Drop in EDMG-014, Alternate RCS Boration
- Procedure FSG-001, Long Term RCS Inventory Control
- Procedure FSG-008, Alternate RCS Boration
- Procedure FSG-010, Passive RCS Injection Isolation
- Calculation RNP-M/MECH-1886, Hydraulic Analysis to Support Fukushima FLEX 4.2 Strategy for Spent Fuel Pool Cooling
- Procedure FSG-011, Alternate SFP Makeup and Cooling
- Procedure FSG-012, Alternate Containment Cooling
- Calculation NAI-1809-001, RNP-2 Reactor Auxiliary Building Extended Loss of AC Power FLEX Response, Rev. 0
- Evaluation DAR-SEE-II-14-4, Evaluation of Alternate Coolant Sources for Responding to a Postulated Extended Loss of All AC Power at the H.B. Robinson Steam Electric Plant Unit No. 2
- Calculation RNP-E/ELEC-1220, Rev. 0, Diesel Generator Loading Calculation in Support of Electrical FLEX Modification 90617
- Calculation RNP-M/MECH-1590, Time-to-Boil Curves for the Fuel Pool and Refueling Cavity
- Calculation RNP-E-6.032, Fukushima FLEX 4.2 Phase 1 – Load Profile Calculation for Battery A and B, Rev. 0

Robinson

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 Description	Licensee Input Needed
AQ 61	Steam Generator Dryout	The NRC staff expressed concern regarding the timeliness of the operator being able to complete the FLEX pump connection after addressing any possible debris and/or flooding concerns in the cooling water inlet bay. This is a time sensitive action that must be completed before SG dryout occurs. Therefore, the NRC staff requests that the licensee make available an engineering evaluation of potential debris in the area near the cooling water inlet bay and the time validation of performing the connection to the FLEX pump for SG makeup.

Robinson
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
ISE CI 3.1.5.2.A ISE CI 3.2.4.2.A	Heat-Up Calculations	The NRC staff requested that the licensee confirm that actions necessary to ensure equipment functionality and personnel habitability during an ELAP event are appropriately incorporated into the FLEX strategies, based on the analyses of the impact of high temperatures on various areas/compartments. The licensee made available a calculation to confirm the requested information, and the NRC staff is currently reviewing the calculation.
ISE CI 3.2.1.B	Steam Generator Dryout	The NRC staff requested that the licensee address each of the 7 PWROG recommendations listed in Section 3.2 of WCAP- 17601-P. The licensee is using the WCAP value for SG dryout of 61 minutes. A plant specific calculation completed by the licensee shows that SG dryout for Robinson occurs within 35.7 minutes with low SG water level. If the nominal water level is used, the licensee showed a SG dryout value of 64 minutes. (88641 lbms vs 66481 lbms). Using the generic value is conservative with 3 minutes of margin to the hand calculation provided. The plant specific calculation assumes 102% power. The staff is currently reviewing the SG dryout calculations.

Audit Item Reference	Item Description	Action
ISE CI 3.2.3.A AQ 19 AQ 20	Containment Analysis	The NRC staff requested that the licensee make available a containment temperature and pressure analysis to confirm that the Robinson strategy maintains containment. The licensee made available a calculation to confirm the requested information, and the NRC staff is currently reviewing the calculation.

If you have any questions, please contact me at 301-415-5888 or by e-mail at Jason.Paige@nrc.gov.

Sincerely,

/RA/

Jason C. Paige, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket No.: 50-261

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