



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

April 14, 2015

Mr. David A. Heacock
President and Chief Nuclear Officer
Virginia Electric and Power Company
Dominion Nuclear
Innsbrook Technical Center
5000 Dominion Blvd.
Glen Allen, VA 23060-6711

SUBJECT: SURRY POWER STATION, UNIT NOS. 1 AND 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. MF1002, MF1003, MF1004, AND MF1005)

Dear Mr. Heacock:

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. ML13063A181), Virginia Electric and Power Company (Dominion, the licensee) submitted its OIP for Surry Power Station, Unit Nos. 1 and 2 (Surry) in response to Order EA-12-049. By letters dated August 23, 2013, February 27, 2014, August 28, 2014, and March 2, 2015 (ADAMS Accession Nos. ML13242A013, ML14069A015, ML14251A035, and ML15069A234, respectively), Dominion 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 Surry interim staff evaluation (ISE) on February 19, 2014 (ADAMS Accession No. ML14002A145), and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13063A013), the licensee submitted its OIP for Surry in response to Order EA-12-051. By e-mail dated July 11, 2013 (ADAMS Accession No. ML13280A058), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 8, 2013, August 23, 2013, February 27, 2014, August 26, 2014, and March 2, 2015 (ADAMS Accession Nos. ML13225A007, ML13242A016, ML14069A010, ML14245A402, and ML15069A229, respectively), the licensee submitted its RAI responses and first four six-month updates to the OIP.

The NRC staff's review led to the issuance of the Surry ISE and RAI dated November 1, 2013 (ADAMS Accession No. ML13298A625). 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 audit process, to include the in-office and onsite portions, allows the staff to assess whether it has enough information to make a safety evaluation of the Integrated Plans. The audit allows 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 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 Surry from January 12-16, 2015, per the audit plan dated December 11, 2014 (ADAMS Accession No. ML14343A141). 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, review of staging and deployment of offsite equipment, and review of installation details for 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.

D. Heacock

- 3 -

If you have any questions, please contact me at 301-415-1924 or by e-mail at tony.brown@nrc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read 'Tony Brown', with a stylized flourish at the end.

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

Docket Nos.: 50-280 and 50-281

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
VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNIT NOS. 1 AND 2
DOCKET NOS. 50-280 and 50-281

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. ML13063A181), Virginia Electric and Power Company (Dominion, the licensee) submitted its OIP for Surry Power Station, Unit Nos. 1 and 2 (Surry) in response to Order EA-12-049. By letters dated August 23, 2013, February 27, 2014, August 28, 2014, and March 2, 2015 (ADAMS Accession Nos. ML13242A013, ML14069A015, ML14251A035, and ML15069A234, respectively), Dominion 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

Enclosure

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 Surry interim staff evaluation (ISE) on February 19, 2014 (ADAMS Accession No. ML14002A145), and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13063A013), the licensee submitted its OIP for Surry in response to Order EA-12-051. By email dated July 11, 2013 (ADAMS Accession No. ML13280A058), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 8, 2013, August 23, 2013, February 27, 2014, August 26, 2014, and March 2, 2015 (ADAMS Accession Nos. ML13225A007, ML13242A016, ML14069A010, ML14245A402, and ML15069A229, respectively), the licensee submitted its RAI responses and first four six-month updates to the OIP. The NRC staff's review led to the issuance of the Surry ISE and RAI dated November 1, 2013 (ADAMS Accession No. ML13298A625). 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 audit process, to include the in-office and onsite portions, allows the staff to assess whether it has enough information to make a safety evaluation of the Integrated Plans. The audit allows 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 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 Surry from January 12-16, 2015, per the audit plan dated December 11, 2014 (ADAMS Accession No. ML14343A141). 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 (MS) 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, review of staging and deployment of offsite equipment, and review of installation details for 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 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 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). For Order EA-12-051, the staff will make a safety determination using the NEI developed 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 for compliance, additional 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 Surry facility from January 12, 2015, through January 16, 2015. The NRC audit team staff was as follows:

| Title | Team Member | Organization |
|--------------------------------------|--------------------|---------------------|
| Team Lead/Project Manager | Tony Brown | NRR/JLD |
| Technical Support – Balance of Plant | Kevin Roche | NRR/JLD |
| Technical Support – Reactor Systems | Joshua Miller | NRR/JLD |
| Technical Support – Electrical | Matthew McConnell | NRR/JLD |
| Technical Support – SFPI | Khoi Nguyen | NRR/JLD |
| Technical Support – SFPI | Duc Nguyen | NRR/JLD |
| Training Observer and Support | Kevin Witt | NRR/JLD |

The NRC staff executed the onsite portion of the audit per the three part approach discussed in the December 11, 2014, 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 (January 12, 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 describing the site's strategies to meet the NRC orders. The licensee reviewed 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 reviewed was the design and location of the storage facilities for the FLEX equipment, the interface with the National Strategic Alliance for FLEX Emergency Response (SAFER) Response Center including staging areas, the SFP level indication modification, the modifications planned to enhance emergency communications, preventative maintenance plans for the FLEX equipment, procedural enhancements such as development of FLEX support guidelines (FSGs), and operator training.

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 identified in the plan. Results of these technical reviews and any additional review items needed from the licensee are documented in the audit item status table in Attachment 3, as discussed in the Conclusion section below.

3.1 Reactor Systems Technical Discussions and Walk-Downs

NRC staff met with licensee staff to discuss the amount of leakage from the reactor coolant pump (RCP) seals, the timing of the injection of borated water into the reactor coolant system (RCS), and the availability of borated water sources. NRC staff reviewed the boration calculations and flow calculations, along with applicable procedures. NRC staff determined that the amount of leakage from the RCP seals needed to be finalized, which would affect the other parameters.

3.2 Electrical Technical Discussions and Walk-Downs

a. NRC staff reviewed the calculations on extending battery life based on load shedding, and walked down the battery rooms to evaluate strategies for hydrogen and temperature control. NRC staff also walked down panels used for load shedding to evaluate feasibility and timing.

b. NRC staff walked down connection points and locations for FLEX electrical generators. The staff reviewed the licensee's load and sizing calculations for the FLEX generators. The staff also walked down the storage locations for the FLEX diesel generators.

3.3 SFPI Technical Discussions and Walk-Downs

NRC staff walked down instrument, transmitter, electronics, and display locations for the SFP level instrumentation, along with the associated cable runs. 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. NRC staff met with licensee staff to discuss the required robust sources of water for the turbine-driven auxiliary feedwater (TDAFW) pump. The staff conducted a walkdown of the locations of the water sources to be used as well as the connection points inside the protected plant buildings. The staff also reviewed the procedures for providing makeup to the steam generators (SGs), as well as alternate methods as needed.

b. NRC staff toured the Beyond-Design-Basis Storage Building and reviewed the building plans. The staff walked down equipment haul routes from the storage building to the designated deployment sites, and walked down haul routes from designated staging areas for equipment that will be delivered from the National SAFER Response Center.

c. 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 (primary and alternate).

d. 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.

e. The staff reviewed the licensee's plans to ensure adequate communications, lighting, personnel access, and equipment access, to successfully implement the strategies. The staff interviewed plant personnel responsible for these areas, and observed lighting and communication needs during plant walkdowns.

f. The licensee's cooldown strategy relies on operation of the SG power operated relief valves (PORVs). The licensee indicated that nitrogen bottles will be used to provide motive force for the PORVs. Additionally, no electrical power will be required to operate the valves locally. The staff observed these mechanisms during the plant walkdown and also reviewed the site procedures for operation of the PORVs.

4.0 Exit Meeting (January 16, 2015)

The NRC staff audit team conducted an exit meeting with 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 NRC staff also discussed the remaining open items with the licensee and information needed for closure. The open items are listed in Attachment 3 of this report.

CONCLUSION

The NRC staff completed all three parts of the December 11, 2014, onsite audit plan. The audit items identified in Part 2 of the plan were 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, Attachment 3 provides the status of all open audit review items that the NRC staff is evaluating in anticipation of issuance of a combined safety evaluation for both the MS and Spent Fuel Pool Level Instrumentation 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. Spent Fuel Pool Level Instrumentation (SFPLI) Requests for Additional Information (RAIs)
- e. Additional Safety Evaluation (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: MS/SFPI SE Audit Items currently under NRC staff review (licensee input needed as noted)

While this report notes the completion of the onsite portion of the audit per the audit plan dated December 11, 2014, 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 Attachment 3 provides a list of currently open items, 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. MS/SFPI Audit Items currently under NRC staff review

Onsite Audit Participants

NRC Staff:

| | |
|-------------------|--------------|
| Tony Brown | NRR/JLD/JOMB |
| Kevin Roche | NRR/JLD/JCBB |
| Joshua Miller | NRR/JLD/JERB |
| Matthew McConnell | NRR/JLD/JERB |

| | |
|-------------|--------------|
| Khoi Nguyen | NRR/JLD/JERB |
| Duc Nguyen | NRR/JLD/JERB |
| Kevin Witt | NRR/JLD/JPSB |

Surry and Dominion Staff:

| | |
|-----------------|-------------------------------------|
| Alan Dowell | BDB Project Engineer |
| Anthony Parsons | Supervisor Nuclear Security - Surry |
| Ben Rodill | BDB Nuclear Engineer III |
| Bill Thomas | BDB Mechanical Engineer Design Lead |
| Bill Webster | Supervisor PRAA |
| Bob Eller | Sr. Instructor |
| Dave Bucheit | BDB Manager |
| Dave Lippard | BDB Licensing Engineer |
| Dean Price | Supervisor BDB Storage Buildings |
| Diane Aitken | BDB Licensing Lead |
| Henry Johnson | Surry Shift Manager |
| Jeff Spence | Corporate Training Manager |
| Jim Zaborowski | BDB FLEX Strategies Supervisor |
| Kurt Rowland | BDB (SPS) Project Manager |
| Michael Henig | BDB Projects/SFPLIS Supervisor |
| Noval Smith | BDB Analyst |
| Roger Jones | Sr. I&C Technician - Surry |
| Sheri Tew | BDB Licensing Support |
| Wayne Anthes | BDB Lead Equipment Strategy |

Documents Reviewed

- CM-AA-BDB-10, "Beyond Design Basis FLEX Program," Rev. 0
- CM-AA-BDB-101, "Beyond Design Basis FLEX Program Maintenance," Rev. 0
- CM-AA-BDB-102, "Beyond Design Basis FLEX Equipment Unavailability Tracking," Rev. 1
- CN-PEUS-14-3, "Seismic Analysis of the SFP Mounting Bracket for Surry Power Station, Millstone Power Station Unit 3, & North Anna Power Station," Rev. 1
- EQ-QR-269, "Design Verification Testing Summary Report for the Spent Fuel Pool Instrumentation System," Rev. 2
- 0-ICP-FC-L105-1, "Spent Fuel Pool Level (1-FC-L-105-1) Calibration," Rev. 0
- Design Change SU-12-00022, "FLEX BDB Mechanical Connections," Rev. 000
- Design Change SU-13-00015, "BDB Storage Building/ Surry Power Station/ Units 1 & 2," Rev. 000
- Design Change SU-13-01042, "Beyond Design Basis Spent Fuel Pool Level Instrumentation Installation," Rev. 008
- Design Change SU-14-01034, "BDB Offsite Communications," Rev. 000
- Westinghouse Letter LTR-SEE-11-13-47, "Determination if the Proposed Spent Fuel Pool Level Instrumentation can be sloshed out of the Spent Fuel Pool during a Seismic Event," Rev. 0, January 15, 2014
- Drawing NUS-2026, "Detail No. R-1 Standard Safety Related Conduit Support – Surry Nuclear Power Station Unit 1&2," Rev. 4
- Drawing 1301042-1-S-002, "Installation Sketch Spent Fuel Pool Sensor Head Unit Mount – Surry Power Station Unit 1," Rev. 1
- Drawing Nos. 1301042-11548-LP-2514-A, "Lighting Panelboard Schedule 02-EP-LP-2S14 Surry Power Station Unit 2," Rev. 0
- Drawing 11548-FE-13A, "Wiring Diagram Lighting Distribution Surry Power Station Unit 2," Rev. 17
- Drawing 11548-FC-1C, "4160V One Line Diagram Surry Power Station Unit 2," Rev. 14
- Drawing 1301042-11448-LP-1S14-B, "Lighting Panelboard Schedule 01-EP-LP-1S14 Surry Power Station Unit 2," Rev. 1
- Drawing 11448-FE-1C, "One Line Diagram 4160V Transfer Bus F Surry Power Station Unit 1," Rev. 24
- ER-AA-102, "Preventive Maintenance Program," Rev. 8
- ER-AA-PRS-1010, "Preventive Task Basis & Maintenance Strategy," Rev. 7
- ETE-CPR-2012-0011, "Beyond Design Basis – FLEX Strategy Overall Integrated Plan Basis Document," Rev. 2

- ETE-CPR-2012-0020, "Surry Units 1 & 2 – Reliable Spend Fuel Pool Instrumentation Project Documentation," Rev. 0
- Maintenance Strategy 00-BDB-P-1A-UNIT, "BDB High Capacity Pump 1A," 3/10/2015
- Maintenance Strategy 00-BDB-P-3A-UNIT, "BDB RCS Pump 3A," 3/10/2015
- Maintenance Strategy 00-BDB-GEN-1A-UNIT, "BDB 40 KW 120/240 VAC Diesel Generator 1A," 12/8/2014
- Maintenance Strategy 00-BDB-GEN-2A-UNIT, "BDB 350 KW 480 VAC Diesel Generator 2A," 3/10/2015
- Maintenance Strategy 00-BDB-C-1-UNIT, "BDB Compressor 1," 3/10/2015
- ME-0963, "NPSH Analysis for the TDAFW pump taking suction from the Emergency Condensate Makeup Tank (ECMT)," Rev. 0
- ME 0964, "Evaluate the High Head Injection pump for Beyond Design Basis (BDB) at the primary and alternate supply locations in Modes 1-4 and the BDB AFW pump in Modes 5 and 6," Rev. 0
- ME-0967, "Beyond Design Basis (BDB) - BDB High Capacity Pump and BDB AFW Pump Hydraulic Analysis for Spent Fuel Pool Makeup and AFW Injection at SPS Units 1 and 2," Rev. 0
- ME-0969, "Evaluation of the TDAFW Pump Performance at Low Steam Generator Pressures," Rev. 0
- ME-0973, Addendum A, "Evaluation of Room Air Temperature Following Extended Loss of AC Power (ELAP)," Rev. 0
- MISC-11792, "Extended Loss of AC Power, Spent Fuel Pool Heatup and Water Makeup for Dominion Nuclear Units," Rev. 0
- RA-0047, "Radiological Evaluation following a Beyond Design Basis Surry Power Station (SPS) SFP Draindown for NEI 12-02," Rev. 0
- 0-FSG-5, "Initial Assessment and FLEX Equipment Staging," Rev. 0, Draft C
- 0-FSG-11, "Alternate SFP Makeup and Cooling," Rev. 0, Draft C
- 1-AP-10.21, "Loss of All AC While on RHR," Rev. 0, Draft C
- 1-AP-27.00, "Loss of Decay Heat Removal Capability," Rev. 26
- 1-FSG-1, "Long Term RCS Inventory Control," Rev. 0, Draft C
- 1-FSG-2, "Alternate AFW Suction Source," Rev. 0, Draft C
- 1-FSG-3, "Alternate Low Pressure Feedwater," Rev. 0, Draft C
- 1-FSG-4, "ELAP DC Bus Load Shed/Management," Rev. 0, Draft C
- 1-FSG-6, "Alternate ECST Makeup," Rev. 0, Draft C
- 1-FSG-7, "Loss of Vital Instrumentation or Control Power," Rev. 0, Draft C
- 1-FSG-8, "Alternate RCS Boration," Rev. 0, Draft C
- 1-FSG-9, "Low Decay Heat Temperature Control," Rev. 0, Draft C
- 1-FSG-10, "SI Accumulator Isolation," Rev. 0, Draft C
- 1-FSG-12, "Alternate Containment Cooling," Rev. 0, Draft C
- 1-FSG-13, "Transition from FLEX Equipment," Rev. 0, Draft C
- 1-FSG-14, "Shutdown RCS Makeup," Rev. 0, Draft C
- 1-FSG-15, "4160 VAC Generator Connection and Operation," Rev. 0, Draft C
- 1-ECA-0.0, "Loss of All AC Power," Rev. 36
- 2-ECA-0.0, "Loss of All AC Power," Rev. 37

- SPS_OIP_OI_16_Fuel_Consumption_Table
- Test Report LTR-SFPIS-14-120, Rev. 0
- Data Sheet 0-ICP-FC-L-105-2, "Indication and PCS Point Data Sheet," January 15, 2015
- AREVA Inc. Document No. 51-9233430-000, "Surry Power Station SAFER Response Plan," Rev. 000
- Automation and Field Service (AFS) WNA-PT-00188-GEN, "Spent Fuel Pool Instrumentation System (SFPIS) Standard Product Test Strategy," Rev. 2
- "Surry Power Station Spent Fuel Pool Level Instrumentation System Recurring Task Evaluations"
- "Surry Power Station Beyond-Design-Basis Equipment Haul Route Evaluation, February 2015," 3/2/2015
- Schnabel Engineering Reference #13613080, "Geotechnical Engineering Report, BDB Flex Storage Building – Surry Power Station," 9/19/2013
- Schnabel Engineering Reference #13613080, "Geotechnical Engineering Report – Addendum No. 2, BDB Flex Storage Building - Surry Power Station," 2/26/2015

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

Audit Items Currently Under NRC Staff Review, Requiring Licensee Input As Noted

| Audit Item Reference | Item Description | Licensee Input Needed |
|----------------------|--|--|
| ISE CI 3.2.1.2.A | RCP Seal Leakage. Confirm that, if the seals are changed to non-Westinghouse seals, the licensee addresses the acceptability of the use of non-Westinghouse seals, and provides the acceptable justification for the RCP seal leakage rates for use in the ELAP [extended loss of alternating current power] analysis, to include whether the FlowServe white paper justifies the use of the FlowServe N-9000 seals and bounds the 21 gpm/sealleakage rate assumed in the analysis. | The licensee stated that all RCPs at Surry have Flowserve N-9000 seals installed. Although the licensee expects the leakage rate for an N-9000 seal to be substantially reduced relative to a standard Westinghouse seal, adequate basis was not provided during the audit to support the leakage rates assumed in the licensee's analysis. The staff requests that the licensee make available for audit documentation that justifies the analytically assumed leakage rates are representative, or conservative, for the installed N-9000 seals. |
| ISE CI 3.2.1.2.B | RCP Seal Leakage. Confirm FlowServe white paper justifies that the integrity of the O-rings will be maintained above the temperature conditions experienced during the ELAP event (approximately 556 °F) and if the SG PORV modification to add a protected backup air bottle system has an impact in the analysis. | The staff requests that the licensee make available for audit, documentation that justifies the performance of the N-seal o-rings will be acceptable under post trip conditions experienced during ELAP event. As noted, the RCS cold leg temperature depends on whether the SG PORV is used promptly following the trip, or if the main steam safety valve lift setpoint will be reached. |
| AQ #27 | <p>In the 6-month update, the licensee is changing their strategy from: installing manual operators on the SG PORVs, to installing a backup air bottle system.</p> <p>Note that Surry already has a backup air bottle system for the PORVs that allow the operators to operate the PORVs from the adjacent containment spray room.</p> <p>The staff requests the licensee describe the new backup air bottle system and its operation (e.g., expected cycles), include a discussion on where operators will be required to operate this system and evaluate effects of the environmental conditions, noise, communications, heat, etc.</p> | <p>The staff requests that the licensee make available for audit documentation that justifies that during a wind driven missile event, access to the PORV/auxiliary feedwater (AFW) rooms will not affect the cooldown of the RCS including:</p> <ul style="list-style-type: none"> - Access to the room via exterior ladders during a high wind event. - Ensuring that the SGs are not overfilled by ability to control the turbine driven auxiliary feedwater (TDAFW) pump, including starting and stopping the TDAFW pump. - N-9000 seal leakage rates are not affected due to delayed cooldown, if the rooms can't be accessed within the required time, or TDAFW pumps can't be controlled successfully. |

| Audit Item Reference | Item Description | Licensee Input Needed |
|-----------------------------|---|---|
| OIP OI #1 | Verify response times listed in timeline and perform staffing assessment. | Verification of response times are being validated and documented in ETE-CPR-2014-1010, "Surry Power Station Beyond Design Basis FLEX Validation of Time Sensitive Actions (TSAs)." Testing will be completed prior to implementation following the spring 2015 Refueling Outage. Upon completion, the staff requests that the licensee make available for audit ETE-CPR-2014-1010. |

D. Heacock

- 3 -

If you have any questions, please contact me at 301-415-1924 or by e-mail at tony.brown@nrc.gov.

Sincerely,

/RA/

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

Docket Nos.: 50-280 and 50-281

Enclosure:
Audit report

cc w/encl: Distribution via Listserv

DISTRIBUTION:

PUBLIC
JOMB R/F
RidsNrrDorlLpl2-1 Resource
RidsNrrPMSurry Resource
RidsNrrLASLent Resource
RidsAcrcsAcnw_MailCTR Resource

RidsRgn2MailCenter Resource
TBrown, NRR/JLD/JOMB
MHalter, NRR/JLD/JOMB

ADAMS Accession No. ML15096A391

***via email**

| | | | | |
|--------|--------------------|---------------------|----------------------|-----------------|
| OFFICE | NRR/JLD/JOMB/PM | NRR/JLD/LA | NRR/JLD/JCBB/BC | NRR/JLD/JERB/BC |
| NAME | TBrown | SLent | SBailey (BTitus for) | SWhaley |
| DATE | 04/07/15 | 04/07/15 | 04/09/15 | 04/08/15 |
| OFFICE | NRR/JLD/JOMB/BC(A) | NRR/DORL/LPL2-1/PM* | NRR/JLD/JOMB/PM | |
| NAME | MHalter | KCotton | TBrown | |
| DATE | 04/13/15 | 04/13/15 | 04/14/15 | |

OFFICIAL AGENCY RECORD