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

December 9, 2014

Vice President, Operations
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3 - 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. MF0744, MF0745, MF0737, AND MF0738)

Dear Sir or 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. ML13079A348), Entergy Nuclear Operations, Inc. (Entergy, the licensee) submitted its OIP for Indian Point Nuclear Generating Unit Nos. 2 and 3 (Indian Point) in response to Order EA-12-049. By letters dated August 27, 2013, February 27, 2014, and August 27, 2014 (ADAMS Accession Nos. ML13247A032, ML14070A365, and ML14251A227, respectively), Entergy submitted its first three 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 Indian Point interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13337A594) and continues with in-office and onsite portions of this audit.

By letter dated February 27, 2013 (ADAMS Accession No. ML13072A082), the licensee submitted its OIP for Indian Point in response to Order EA-12-051. By letter dated June 25, 2013 (ADAMS Accession No. ML13169A127), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 20, 2013, August 27, 2013, February 27, 2014, and August 27, 2014 (ADAMS Accession Nos. ML13239A238, ML13247A031, ML14070A447, and ML14251A226, respectively), the licensee submitted its RAI responses and first three six-month updates to the OIP. The NRC staff's review led to the issuance of the

Indian Point ISE and RAI dated November 8, 2013 (ADAMS Accession No. ML13298A805). 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 Indian Point from October 27-30, 2014, per the audit plan dated September 30, 2014 (ADAMS Accession No. ML14269A384). 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 a successful path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussions, 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. For many audit items, the licensee had only prepared responses that were applicable to Indian Point Unit 3. However, some of the audit items, such as storage of the Mitigation Strategies equipment, are applicable to both units. Due to the timing of the refueling outages, Unit 3 is required to achieve compliance with the Mitigation Strategies and SFPI orders in spring 2015, about a year before the compliance date for Unit 2. The NRC staff will determine if another audit visit is necessary for Unit 2.

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 301-415-2901 or by e-mail at John.Boska@nrc.gov.

Sincerely,

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

Docket Nos.: 50-247 and 50-286

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 NUCLEAR OPERATIONS, INC.

# INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3

# DOCKET NOS. 50-247 and 50-286

## 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. ML13079A348), Entergy Nuclear Operations, Inc. (Entergy, the licensee) submitted its OIP for Indian Point Nuclear Generating Unit Nos. 2 and 3 (Indian Point) in response to Order EA-12-049. By letters dated August 27, 2013, February 27, 2014, and August 27, 2014 (ADAMS Accession Nos. ML13247A032, ML14070A365, and ML14251A227, respectively), Entergy submitted its first three 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 Indian Point interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13337A594) and continues with in-office and onsite portions of this audit.

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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 Indian Point from October 27-30, 2014, per the audit plan dated September 30, 2014 (ADAMS Accession No. ML14269A384). 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. For many audit items, the licensee had only prepared responses that were applicable to Indian Point Unit 3. However, some of the audit items, such as storage of the Mitigation Strategies equipment, is applicable to both units. Due to the timing of the refueling outages, Unit 3 is required to achieve compliance with the Mitigation Strategies and SFPI orders in spring 2015, about a year before the compliance date for Unit 2. The NRC will determine if another audit visit is necessary for Unit 2.

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 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 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 Indian Point facility from October 27, 2014, through October 30, 2014. The NRC audit team staff was as follows:

| Title | Team Member | Organization |
|---|---|---|
| Team Lead/Project Manager | John Boska | NRR/JLD |
| Branch Chief | Bo Pham | NRR/JLD |
| Technical Support – Electrical | Matthew McConnell | NRR/JLD |
| Technical Support – Electrical | Duc Nguyen | NRR/JLD |
| Technical Support – Reactor Systems | Joshua Miller | NRR/JLD |
| Technical Support – Balance of Plant | On Yee | NRR/JLD |
| Technical Support – Balance of Plant | Kevin Roche | NRR/JLD |
| Technical Support – I&C | Khoi Nguyen | NRR/JLD |
| Project Manager | Stephen Philpott | NRR/JLD |
| Resident Inspector | Garrett Newman | Region I |

The NRC staff executed the onsite portion of the audit per the three part approach discussed in the September 30, 2014, plan, to include conducting a tabletop discussion of the site's integrated mitigating strategies (MS) compliance program, a review of specific technical review items, and discussion of specific program topics. Activities that were planned to support the above included detailed analysis and calculation discussions, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

AUDIT SUMMARY

1.0 Entrance Meeting (October 27, 2014)

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 for Unit 3 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 Centers including staging areas, the spent fuel pool 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 listed 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 Unit 3 reactor coolant pump (RCP) seals, the timing of the injection of borated water into the reactor coolant system, and the mixing of that water during natural circulation conditions. The licensee proposed throttling existing valves in the RCP number one seal leakoff line to restrict the leakage flow. NRC staff reviewed the flow calculation and had numerous questions for the licensee. NRC staff determined that the amount of leakage from the RCP seals needed to be finalized, and that 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. In order to provide electrical power, the plan is to move a 480v, 600kw, FLEX generator from the FLEX equipment storage building (FESB) to the transformer yard, and run temporary cables inside the control building to a new panel which will allow energizing the 480v safety buses. An alternate location has been identified in case the transformer yard is not accessible. The staff reviewed the licensee's load and sizing calculations for the FLEX generators and found them acceptable.

3.3 SFPI Technical Discussions and Walk-Downs

NRC staff walked down the location of the level sensors in the Unit 3 SFP and the cable runs (in metal conduit) from the sensors to the electronics in the Unit 3 fan house where the operators will read the level indication. No concerns were identified during the walkdown.

3.4 Other Technical Discussion Areas and Walk-Downs

a. NRC staff met with licensee staff to discuss the required robust source of water for the turbine-driven auxiliary feedwater (TDAFW) pump. The normal supply from the condensate storage tank (CST) was previously noted in the NRC's ISE to be susceptible to tornado-borne missiles. The licensee performed tornado analyses in order to credit using the water supply from the city water tank, which is already piped to the suction of the TDAFW pump but must be locally aligned. Although the city water tank is not protected from tornado-borne missiles, the separation from the CST is sufficient to credit the survival of one of the tanks. The staff walked down the physical locations of the CST and the city water tank, and reviewed the tornado analyses.

b. NRC staff toured the FESB and reviewed the building modifications and noted that it was a robust building (as defined in NEI 12-06) and was above the postulated flood levels.

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). No concerns other than those stated elsewhere in this section were identified.

d. NRC staff walked down the access points to the safety-related fuel oil storage tanks (FOSTs), which will be the source of the diesel fuel used to refuel the FLEX equipment. The access points are accessible considering the current flooding licensing basis. Staff walked down the refueling paths to be used by the refueling trailer.

e. The licensee's cooldown strategy relies on operation of the steam generator (SG) atmospheric dump valves (ADVs). The NRC staff noted that the licensee would need to align a supply of bottled nitrogen gas to provide the motive force for ADV operation. The staff has questions on this supply and the length of time that the ADVs could be operated.

4.0 Exit Meeting (October 30, 2014)

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 following open items were discussed at the exit meeting (see Attachment 3 for additional information):

a. ISE CI 3.2.3.A, Containment Evaluation
The calculation of the conditions inside the containment building was done by the licensee with an assumption of an initial leak rate of 21 gallons per minute (gpm) seal leakage per RCP. As the RCP seal leakage model has not been accepted yet by the NRC staff, it is not possible to perform a final evaluation of this calculation.

b. ISE CI 3.2.4.2.A, Room Temperatures
The NRC staff needs additional information on the maximum predicted temperatures in rooms where FLEX equipment is operating, and the equipment temperature limits, to confirm that there is no impact on equipment operation.

c. ISE CI 3.2.4.3.A, Heat Tracing
The NRC staff needs additional information on the ability to use outdoor tanks during extreme cold conditions with no operational heat tracing.

d. AQ-27, Maintenance and Testing of FLEX Equipment
The NRC staff has concerns that testing procedures may not have sufficient details, such as acceptance criteria and shelf-life considerations for FLEX equipment, to identify when FLEX equipment needs to be repaired or replaced. Also, the licensee plans to extend certain intervals between testing longer than stated in the EPRI templates endorsed by the NRC. The licensee will provide a report which evaluates this extension.

e. AQ-28, Offsite Resources
The NRC staff identified that a revision is needed to procedure FSG-100 in order for the licensee staff to reach the step to activate the offsite resource delivery. The licensee also needs to finalize the SAFER Response Plan for Indian Point, and finalize contractual arrangements for the use of the offsite staging areas.

f. AQ-46, Battery Room Temperature Extremes
The NRC staff needs additional information to evaluate the performance of the plant batteries considering the temperature extremes (hot and cold) that may be reached in the battery rooms.

g. AQ-51, Use of Non-Safety-Related Equipment
The NRC staff needs information on the use of non-safety-related installed electrical equipment credited during an ELAP event and its ability to perform its safety function considering the potential external hazards.

h. SFPI RAI-14, Procedures for Operation, Test, and Calibration of New SFP Instrumentation
The NRC staff needs to review the procedures associated with the new SFP level instruments. These procedures were not yet available for review.

i. SFPI RAI-18, Actions For SFPI Channels Out of Service
The NRC staff needs details for actions to be taken when the new SFPI channels are out of service.

j. SE #2, RCP Seal Leakage and NSAL 14-1
Westinghouse nuclear safety advisory letter NSAL -14-1 indicates there may be higher leakage from the reactor coolant pump (RCP) seals during an extended loss of ac power (ELAP) than was previously analyzed. The licensee proposed to limit leakage by throttling existing valves in the #1 seal leakoff line. The NRC staff expressed concerns regarding the licensee's proposal. The licensee is working to resolve this issue, and is considering modifications to the plant. The NRC will review the final resolution.

k. SE #5, Accuracy of the NOTRUMP Computer Code
Westinghouse used the NOTRUMP computer code to develop certain timelines for operator actions in an ELAP event (see WCAP-17601-P for example). NRC simulations using the TRACE code indicate some differences, which may be significant enough to affect the timeline for operator actions. The Pressurized-Water Reactor Owners Group (PWROG) is working with the NRC on a resolution, which may be applicable to all PWRs. The NRC staff also needs a comparison chart from the licensee to compare how the plant parameters assumed in the Westinghouse analyses compare to Indian Point parameters.

l. SE #7, Operation of the SG ADVs
The NRC staff has concerns with the nitrogen bottles used to provide the motive force to operate the SG ADVs, needed for plant cooldown. The staff needs additional information on the capacity of the nitrogen bottles, and what other equipment uses those bottles.

m. SE #13, RCP Seal Leakage Rates
The NRC staff needs information to demonstrate that the current RCP seal leakage rate calculation is accurate or conservative.

n. SE #14, Pressurization of the RCP #1 Seal Leakoff Line
The NRC staff has asked the licensee to determine the expected maximum pressure in the #1 seal leakoff line during this event and to demonstrate that the components of this line will not fail in such a manner that will increase the seal leakage.

CONCLUSION

The NRC staff completed all three parts of the September 30, 2014, 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, 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 Mitigation Strategies and Spent Fuel Pool 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. SFPI Requests for Additional Information (RAIs)

e. Additional information needed to support the Safety Evaluation (SE)

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 September 30, 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:

| | |
|---|---|
| Bo Pham | NRR/JLD/JERB |
| John Boska | NRR/JLD/JOMB |
| Stephen Philpott | NRR/JLD/JOMB |
| Matthew McConnell | NRR/JLD/JERB |
| Duc Nguyen | NRR/JLD/JERB |

| | |
|---|---|
| On Yee | NRR/JLD/JCBB |
| Kevin Roche | NRR/JLD/JCBB |
| Joshua Miller | NRR/JLD/JERB |
| Khoi Nguyen | NRR/JLD/JERB |
| Garrett Newman | NRC/RI |

Indian Point Staff:

| | |
|---|---|
| Steve Prussman | Regulatory Affairs |
| Richard Louie | Regulatory Affairs |
| John Ferrick | Production Manager |
| Tom Cramer | Operations |
| Walt Wittich | FLEX Strategy Technical Lead |
| Rich Drake | Civil/Structural Engineering Supervisor |
| John Hill | I&C Design Engineering Supervisor |
| Lori Glander | Emergency Preparedness Manager |
| Brian Sullivan | Superintendent, Operations Training |
| Brett Ulrich | Operations |
| Dave Powell | Operations |
| Danny Gunn | Operations |
| Mark Laubach | Engineering |
| Leon Mavridis | Engineering |
| Adam Kaczmarek | I&C Engineer |
| Bill Chenault | Contractor, Enercon |
| Mike Cali | Contractor, Enercon |
| William Chausse | Contractor |
| | |

**Documents Reviewed**

- IP-RPT-14-00011, "FLEX Debris Removal Assessment For Indian Point Energy Center" (7/17/4)
- IP-RPT-13-00055, " Indian Point Energy Center Unit 3 Tornado Wind and Missile Impact on Water Storage Tanks." Rev 0.
- A14058-C-002, Rev. 0, "Evaluation of Interim Radwaste Storage Facility Walls for Transient Tornado Loads Associated with FLEX Equipment Storage"
- A14058-R-001, Rev. 0, "Interim Radwaste Storage Facility Robust Structural Evaluation for FLEX Equipment Storage"
- A14058-R-002, Rev. 0, "Analysis and Design Modifications of the Interim Radwaste Storage Facility for FLEX Equipment Storage"
- A14058-D-003, IRSF Wall 1, 4 and 6 Modification Details
- IP-CALC- 14-00032, "Sliding and Rocking Evaluation of Equipment inside FLEX Interim Radwaste Storage Facility" (6/13/14)
- IP-CALC14-00033, "Heatup of Interim Radwaste Storage Facility for Extreme Outdoor Temperatures" (6/3/2014)
- Engineering Change EC 48763, Engineering Change to Modify the IRWSF
- Sketch SK-EC-48763-1, Indian Point Flex Equipment Storage Building Proposed Layout N+1 Set of Equipment (IP2 and IP3)
- Sketch SK-EC-48763-2, Indian Point Flex Equipment Storage Building Proposed Layout for Unit 3 N+1 Set of Equipment
- Purchase Order 10416439 (diesel generators)
- Purchase Order 10416529 (FLEX pumps)
- LTR-LIS-14-207 Rev 0, Westinghouse Review of Decay Heat Model
- IP-CALC-13-00040, Rev 1 "Hydraulic Model for Condensate Storage Tank for FLEX Strategies"
- IP-CALC-13-00045, "FLEX Hydraulic Analysis of FLEX Strategies Using the RWST as a Source of Water," Rev 0.
- IP3-CALC-ED-02563, Hydrogen Concentration in Battery Rooms
- IP-CALC-13-00058, Freezing of Unit 3 Coolant Sources for FLEX Event, Rev.1
- IP-CALC-14-00002, IP3 FLEX Phase 2 Portable Diesel Generator Sizing Calculation, Rev.0
- IP-CALC-14-00098, IP3 FLEX Phase 3 Portable Diesel Generator Sizing Calculation, Rev. 0
- IP CALC-13-00064, "FLEX Event Evaluation of Turbine Driven Auxiliary Feed Pump Room Heat –Up"
- IP-CALC-13-00065, "Main Control Room Heat-Up for FLEX Event"
- IP-CALC-13-00057, Rev. 0, "FLEX Event Diesel Fuel Usages" (IP3 only)
- EN-FLEX Generator 1000kW or Less- Diesel Driven, Rev. 0
- EN-FLEX Pump Diesel Driven, Rev. 0
- IP-EP-250, Rev. 31, Emergency Operations Facility
- IP-CALC-13-00056, Battery Sizing and Voltage Drop Calculation for Extended Loss of Power (ELAP)

- IP-CALC-13-00083, "Evaluation of Conduit Supports for FLEX Program Spent Fuel Pool Level Instrumentation,"
- IP-CALC-13-00082, "Spent Fuel Pool Instrumentation Mounting Bracket"
- IP-CALC-00068, "Fan House Temperature Evaluation for FLEX Event SFP Level Instrument Function," dated December 18, 2013.
- IP3-CALC-RAD-0004, "IP3 Radiological Analysis for Hydrogen Recombiner Cabinet – RM System"
- IP-CALC-13-00072, "Spent Fuel Pool Instrumentation Shielding Calculation"
- IP3-CALC-EL-00113, "Instrument Bus 31 – Voltage Drop Calculation"
- IP3-CALC-EL-00114, "118V AC Instrument Bus 32 – Voltage Drop Calculation"
- IP3-CALC-EL-00188, "Inverter #31 System Component Sizing Analysis"
- IP3-CALC-EL-00189, "Inverter #32 System Component Sizing Analysis"
- IP-RPT-13-00059, Rev. 2 – IP3 FLEX Strategy Development
- IP-CALC-14-00012, "IP3 RCS Inventory Evaluation for FLEX" (2/20/14)
- Engineering Change EC-45666, "Install New Spent Fuel Pool Level Instrumentation in Support of Fukushima NRC Order EA-12-051"
- Drawing 9321-F-39893, "Single Line Diagram 118 VAC Instrument Buses 31, 31A, 32, 32A, 33, 33A, 34, & 34A"
- Drawing 503859, "Fuel Storage Building BDBE Spent Fuel Pool Level Instrumentation Panel Stand Support Detail Civil-Electrical".
- Drawing 503855, "Fuel Storage Building BDBE Spent Fuel Pool Level Instrumentation Conduit Support Layout Electrical," Rev 0.
- Drawing 503901 Sh1, Rev. 0, "FLEX Phase II Generator Connection Panel U3-PNL1"
- Drawing 617F644 Rev. 35, IP3 480 V One Line Diagram
- Draft SAFER Response Plan for Indian Point
- 3-ECA-0.0, Loss of All AC Power
- 3-FSG-001, Long Term RCS Inventory Control
- 3-FSG-002, Alternate Aux Feedwater Suction Source
- 3-FSG-003, Alternate Low Pressure Feedwater
- 3-FSG-004, ELAP DC Bus Load Shed/Management
- 3-FSG-005, Initial Assessment and FLEX Equipment Staging
- 3-FSG-006, Alternate CST Makeup, Rev 0.
- 3-FSG-007, Loss of Vital Instrumentation or Control Power, Rev 0
- 3-FSG-008, Alternate RCS Boration, Rev 0.
- 3-FSG-009, Low Decay Heat Temperature Control
- 3-FSG-010, Passive RCS Injection Isolation
- 3-FSG-011, Alternate Spent Fuel Pool Makeup and Cooling, Rev 0.
- 3-FSG-100, Evaluation of Communications
- 3-FSG-101, Communications
- 3-IC-SI-87, Rev. 1, Contingency Action to Provide Instrumentation Information During Loss of Power
- 0-SE-001, Access Control
- 0-SE-021, IPEC Integrated Response Plan
- 0-SE-301, Contingency Events
- 0-SE-005, Rev 6, Manual Operation of Active Vehicle Barriers

**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 3.2.3.A | Containment Evaluation | The calculation of the conditions inside the containment building was done by the licensee with an assumption of an initial leak rate of 21 gallons per minute (gpm) seal leakage per RCP. As the RCP seal leakage model has not been accepted yet by the NRC staff, it is not possible to perform a final evaluation of this calculation. |
| ISE CI 3.2.4.2.A | Room Temperatures | The staff requested the licensee to provide electrical equipment qualification for the temperatures reached in the control room and TDAFW pump room. |
| ISE CI 3.2.4.3.A | Heat Tracing | The NRC staff needs additional information on the ability to use outdoor tanks during extreme cold conditions with no operational heat tracing, especially when the use of the tank is delayed while FLEX equipment is deployed, and outdoor isolation valves must be opened. |

| Audit Item Reference | Item Description | Licensee Input Needed |
|---|---|---|
| AQ-27 | Maintenance and Testing of FLEX Equipment | The NRC staff has concerns that testing procedures may not have sufficient details, such as acceptance criteria and shelf-life considerations for FLEX equipment, to identify when FLEX equipment needs to be repaired or replaced. Also, the licensee plans to extend certain intervals between testing longer than stated in the EPRI templates endorsed by the NRC. The licensee will provide a report which evaluates this extension. |
| AQ-28 | Offsite Resources | The NRC staff identified that a revision is needed to procedure FSG-100 in order for the licensee staff to reach the step to activate the offsite resource delivery. The licensee also needs to finalize the SAFER Response Plan for Indian Point, and finalize contractual arrangements for the use of the offsite staging areas. |
| AQ-46 | Battery Room Temperature Extremes | The NRC staff requested the licensee to provide a technical basis to support the conclusion that the battery rooms would not exposed to extreme high and low temperatures during the first phase of the ELAP event. |
| AQ-51 | Use of Non-Safety-Related Installed Electrical Equipment | The NRC staff requested the licensee to address non-safety related installed electrical equipment credited for mitigation strategies and whether this equipment will survive the BDBEE. |
| SFPI RAI-14 | Procedures for Operation, Test, and Calibration of New SFP Instrumentation | The NRC staff needs to review the procedures associated with the new SFP level instruments. These procedures were not yet available for review. |
| SFPI RAI-18 | Actions For SFPI Channels Out of Service | The NRC staff needs details for actions to be taken when the new SFPI channels are out of service. |

| Audit Item Reference | Item Description | Licensee Input Needed |
|---|---|---|
| SE #2 | RCP Seal Leakage and NSAL 14-1:<br>Westinghouse nuclear safety advisory letter NSAL -14-1 indicates there may be higher leakage from the reactor coolant pump (RCP) seals during an extended loss of ac power (ELAP) than was previously analyzed. The license is working to resolve this issue, and is considering modifications to the plant. The NRC will review the final resolution. | Provide final resolution for this issue. |
| SE #5 | Accuracy of the NOTRUMP Computer Code:<br>Westinghouse used the NOTRUMP computer code to develop certain timelines for operator actions in an ELAP event (see WCAP-17601-P for example). NRC simulations using the TRACE code indicate some differences, which may be significant enough to affect the timeline for operator actions. The PWROG is working with the NRC on a resolution, which may be applicable to all PWRs. | Provide PWROG resolution on accuracy of the NOTRUMP code. Provide a comparison chart to compare how the plant parameters assumed in the Westinghouse analyses compare to Indian Point parameters. |
| SE #7 | Operation of the SG ADVs | The NRC staff has concerns with the nitrogen bottles used to provide the motive force to operate the SG ADVs, needed for plant cooldown. Provide additional information on the capacity of the nitrogen bottles, and what other equipment uses those bottles. |
| SE #13 | RCP Seal Leakage Rates | The NRC staff needs information to demonstrate that the current RCP seal leakage rate calculation is accurate or conservative. |
| SE #14 | Pressurization of the RCP #1 Seal Leakoff Line | The NRC staff has asked the licensee to determine the expected maximum pressure in the #1 seal leakoff line during this event and to demonstrate that the components of this line will not fail in such a manner that will increase the seal leakage. |

If you have any questions, please contact me at 301-415-2901 or by e-mail at John.Boska@nrc.gov.

Sincerely,

***/RA/***

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

Docket Nos.: 50-247 and 50-286

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