



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

March 17, 2015

Mr. Peter A. Gardner
Site Vice-President
Northern States Power Company – Minnesota
Monticello Nuclear Generating Plant
2807 West County Road 75
Monticello, MN 55362-9637

SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT - REPORT FOR THE
AUDIT REGARDING IMPLEMENTATION OF MITIGATING STRATEGIES
AND RELIABLE SPENT FUEL POOL INSTRUMENTATION RELATED TO
ORDERS EA-12-049 AND EA-12-051 (TAC NOS. MF0923 AND MF0924)

Dear Mr. Gardner:

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. ML13066A066), Northern States Power Company, a Minnesota corporation (NSPM, the licensee), doing business as Xcel Energy, submitted its OIP for the Monticello Nuclear Generating Plant (Monticello) in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, and February 24, 2015 (ADAMS Accession Nos. ML13241A200, ML14065A037, ML14241A260, and ML15055A599, respectively), the licensee 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 issuance of the Monticello interim staff evaluation (ISE) (ADAMS Accession No. ML13220A139) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13060A447), the licensee submitted its OIP for Monticello in response to Order EA-12-051. By e-mail dated June 7, 2013 (ADAMS Accession No. ML13176A331), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 12, 2013, August 28, 2013, February 28, 2014, August 28, 2014, and February 24, 2015 (ADAMS Accession Nos. ML13193A324, ML13241A197, ML14069A463, ML14241A262, and ML15055A600, respectively), the licensee submitted its RAI responses and first four six-month updates to the OIP.

The NRC staff's review to date led to issuance of the Monticello ISE and RAI dated October 28, 2013 (ADAMS Accession No. ML13275A187). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

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

In support of the ongoing audit of the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at Monticello from November 17 - 21, 2014, per the audit plan dated October 22, 2014 (ADAMS Accession No. ML14290A367). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

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

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

Sincerely,



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

Docket No.: 50-263

Enclosure:
Audit report

cc w/encl: Distribution via Listserv



UNITED STATES
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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
NORTHERN STATES POWER COMPANY
MONTICELLO NUCLEAR GENERATING PLANT
DOCKET NO. 50-263

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. ML13066A066), Northern States Power Company, a Minnesota corporation (NSPM, the licensee), doing business as Xcel Energy, submitted its OIP for the Monticello Nuclear Generating Plant (Monticello, or MNGP) in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, and February 24, 2015 (ADAMS Accession Nos. ML13241A200, ML14065A037, ML14241A260, and ML15055A599, respectively), the licensee 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

Enclosure

Regulation (NRR) Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to issuance of the Monticello interim staff evaluation (ISE) (ADAMS Accession No. ML13220A139) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13060A447), the licensee submitted its OIP for Monticello in response to Order EA-12-051. By e-mail dated June 7, 2013 (ADAMS Accession No. ML13176A331), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 12, 2013, August 28, 2013, February 28, 2014, August 28, 2014, and February 24, 2015 (ADAMS Accession Nos. ML13193A324, ML13241A197, ML14069A463, ML14241A262, and ML15055A600 respectively), the licensee submitted its RAI responses and first four six-month updates to the OIP.

The ongoing audits allow the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted and updated information, audit information provided on e-portals, and preliminary Overall Program Documents (OPDs)/Final Integrated Plans (FIPs) while identifying additional information necessary for the licensee to supplement its plan and 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 Monticello from November 17 - 21, 2014, per the audit plan dated October 22, 2014 (ADAMS Accession No. ML14290A367). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

Following the licensee's declarations of order compliance, the NRC staff will evaluate the OIPs, as supplemented, the resulting site-specific OPDs/FIPs, and, as appropriate, other licensee submittals based on the requirements in the orders. For Order EA-12-049, the staff will make a safety determination regarding order compliance using the Nuclear Energy Institute (NEI) guidance document NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" issued in August, 2012 (ADAMS Accession No. ML12242A378), as endorsed by NRC Japan Lessons-Learned Directorate (JLD) interim staff guidance (ISG) JLD-ISG-2012-01 "Compliance with Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events'" (ADAMS Accession No. ML12229A174) as providing one acceptable means of meeting the order requirements. For Order EA-12-051, the staff will make a safety determination regarding order compliance using the NEI guidance document NEI 12-02, Revision 1, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12240A307), as endorsed, with exceptions and clarifications, by NRC ISG JLD-ISG-2012-03 "Compliance with Order EA-12-051, 'Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12221A339) as providing one acceptable means of meeting the order requirements. Should the licensee propose an

alternative strategy or other method deviating from the guidance, additional staff review will be required to evaluate if the alternative strategy complies with the applicable order.

AUDIT ACTIVITIES

The onsite audit was conducted at the Monticello facility from November 17-21, 2014. The NRC audit team staff was as follows:

Title	Team Member
Team Lead/Project Manager	Peter Bamford
Technical Support	Joshua Miller
Technical Support	Bruce Heida
Technical Support	Kerby Scales
Technical Support	Duc Nguyen
Technical Support	Khoi Nguyen
Technical Support	Kevin Roche
NRC Region III (observer)	Laura Kozak

The NRC staff executed the onsite portion of the audit per the three part approach discussed in the October 22, 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 (November 17, 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 titled "Monticello Nuclear Generating Plant Onsite Audit Regarding Implementation of Mitigating Strategies (FLEX) and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051." The licensee provided an overview of its strategy to maintain core cooling, containment, and SFP cooling in the event of a BDBEE, and the plant modifications being done in order to implement the strategies. The licensee also presented the design and location of the FLEX equipment storage facilities, the FLEX equipment that would be stored there, the interface with the National SAFER Response Center, and information regarding communications, program controls, and training. The presentation included an overview of 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 reviews for the items listed in the plan. Results of these technical reviews that require additional information from the licensee or are still under NRC review are documented in the audit item status tables in Attachments 3 and 4, as discussed in the Conclusion section below.

3.1 Reactor Systems Technical Discussions and Walk-Downs

The staff reviewed Monticello's modeling of an extended loss of alternating current power event (ELAP) and its ability to mitigate the event, including the computer code used for the ELAP analysis and input parameters assumed to generate the results of the analysis. Review of the leakage associated with the recirculation pump seals and plant-specific benchmarking information for the computer code used in the thermal-hydraulic analysis remain open items. The NRC staff also reviewed the licensee's evaluations regarding the use of raw makeup water in the reactor coolant system (RCS) and the reactor core to confirm that debris blockage will not impact core cooling. Finally, the staff performed plant walk-throughs of the proposed mitigating strategies to provide core cooling and RCS inventory makeup, including portable pumping equipment, flow paths, and water storage locations.

3.2 Electrical Technical Discussions and Walk-Downs

The NRC staff reviewed the calculations on extending battery life based on load shedding. The staff also walked down the battery rooms and other associated electrical component locations to evaluate strategies for hydrogen and temperature control, as well as load shed feasibility and timing. Regarding audit question (AQ) 24, the staff reviewed the licensee's calculations to verify the minimum [direct current] dc bus voltage that is required to ensure proper operation of all required electrical equipment. To complete the review of this item the staff does not need any additional information from the licensee; however, the staff is reviewing battery life beyond 8 hours on a generic basis with the applicable battery vendors. Once this generic review is completed, and acceptable results confirmed, this item will be closed.

3.2 Balance of Plant Technical Discussions and Walk-Downs

A completed hydraulic analysis was not available at the time of the onsite audit and thus the evaluation of the capability to supply the necessary cooling and makeup flow under ELAP conditions was identified by several audit items. After the completion of the onsite audit activities, the licensee notified the NRC staff that a hydraulic analysis had been subsequently completed, and posted the analysis to the licensee's ePortal. The hydraulic analysis and the associated open items remain under review by the NRC staff. Regarding the RCS injection pathway from the FLEX pump, the staff questioned one of the hose routings in relation to the seismic capability of the building the hose passes through (railroad bay). After the onsite audit activities were completed, the licensee indicated that the railroad bay has been shown to be seismically robust in accordance with NEI 12-06; however that determination remains under review by the staff. The NRC staff also reviewed the licensee's evaluations regarding portable

FLEX equipment diesel fuel consumption requirements, fuel quality, and the strategy to provide adequate fuel supplies for the duration of the postulated event.

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. Regarding confirmatory item (CI) 3.1.1.2.A, Deployment, the staff reviewed the location of the FLEX storage buildings and staging area B. Along with the licensee, the staff walked down the deployment pathways from these locations. The staff also confirmed that, in general, there are multiple pathways to get the necessary equipment to its deployed location.
- b. Regarding CI 3.2.4.4.B, Communications, the staff reviewed the items planned for completion in the licensee's Near-Term Task Force Recommendation 9.3 communications assessment, dated June 14, 2013 (ADAMS Accession No. ML13149A324), to ensure that they were completed as planned. The staff noted that modifications to support the strategy were still in progress. Based on the observed progress and tracking within the licensee's corrective action program, the CI was closed.
- c. Regarding CI 3.3.2.A, Program Controls, the licensee provided a draft program document for NRC review during the audit. The licensee stated that the program would be a controlled document in the configuration management program, similar to a procedure, thus ensuring that the plan will be maintained up-to-date. During the audit the licensee incorporated an NRC comment into the draft document regarding consistency with the NEI 12-06 provisions for change control.
- d. Human factors considerations were reviewed as part of the audit. These considerations were looked at in the form of walkdowns, procedure reviews, and discussion with licensee personnel. The questions included training, accessibility, habitability, procedures, programs, and various other topics. This review identified one item to be pursued further regarding the crediting of offsite personnel for debris removal within six hours of the start of the postulated event. This issue is listed as Safety Evaluation (SE) item SE.5 in Attachment 3.
- e. The NRC audit staff reviewed the licensee's plans for the station batteries, including capacity, load profiles, and load shedding. Regarding battery capacity, Monticello plans to have the station batteries discharging for longer than 8 hours. The staff has requested additional information from the manufacturer (C&D Technologies, Inc.) to demonstrate that their nuclear grade batteries can support battery discharges greater than 8 hours. AQ-24 will remain open for Monticello pending the staff review of additional information from the battery manufacturer. Regarding battery duty cycle load profiles and load shedding, the NRC audit staff reviewed summaries of the results, conclusions, and key assumptions of the licensee's battery calculation to

verify the adequacy of the capacity and capability of the vital batteries to supply dc power to the required loads during the first phase of the Monticello FLEX mitigation strategies. The NRC audit staff also walked down the load shedding procedures with the licensee to verify that load shedding could be completed within the time assumed in its analysis. Based on the onsite audit activities, the NRC audit staff concluded that the Monticello dc system has adequate capacity and capability for the BDBEE mitigation strategy, pending resolution of AQ-24, and that the necessary load shedding could be accomplished within the times assumed in the licensee's analysis.

- f. Regarding SFPI, the NRC staff reviewed the licensee's proposed level instrument arrangement, cable routing, instrument diversity, power supply, and display location using both document reviews and plant walkdowns. The staff also reviewed the licensee's sloshing calculation. No issues requiring follow-up in these areas were identified; however several SFPI open items remain, while licensee staff completes the SFPI maintenance procedure and certain analyses and evaluations, as documented in Attachment 3.

4.0 Exit Meeting (November 21, 2014)

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

CONCLUSION

The NRC staff completed all three parts of the October 22, 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, 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 for both the Mitigation Strategies (MS) and Spent Fuel Pool Level Instrumentation orders. Attachments 3 and 4 include items remaining from the onsite audit, as well as any items that are being reviewed exclusively in the NRC offices (and thus were not included in the onsite audit plan). 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

- d. Spent Fuel Pool Instrumentation (SFPI) Requests for Additional Information (RAIs)
- e. Additional Safety Evaluation (SE) needed information

While this report notes the completion of the onsite portion of the audit per the audit plan dated October 22, 2014, the ongoing audit process continues, as per letters dated August 28, 2013, and March 26, 2014, to all licensees and construction permit holders for both orders.

Additionally, while Attachments 3 and 4 provide a progress snapshot of the NRC staff's review of the licensee's OIPs, as supplemented, and as augmented in the audit process, the status and progress of the NRC staff's review may change based on licensee plan changes, resolution of generic issues, and other NRC staff concerns not previously documented. Changes in the NRC staff review will be communicated in the ongoing audit process.

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 e-portal.

Attachments:

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

Onsite Audit Participants

NRC Staff:

Peter Bamford	NRR/JLD/JOMB
Joshua Miller	NRR/JLD/JERB
Kerby Scales	NRR/JLD/JERB
Duc Nguyen	NRR/JLD/JERB
Khoi Nguyen	NRR/JLD/JERB
Bruce Heida	NRR/JLD/JCBB
Kevin Roche	NRR/JLD/JCBB
Laura Kozak (observer)	RIII/DRP

Monticello Staff:

John Fields	Licensing Engineer
Jon Kapitz	Fukushima Project Director
Jeff Olson	Operations Shift Manager
Rick Zyduck	Design Manager
Jake Strasser	Design Engineer
Tom Parker	Fukushima Response Engineer
Michael Baldwin	Design Engineering
Derrick Sundseth	Design Engineer
Todd Hurrle	Engineering Manager
Tom Ginter	Project Manager
John Grubb	General Manager Fukushima Response
Nadja Paulman	Fukushima Response Manager
Brian Zelenak	Regulatory Affairs/Licensing Manager
Jerry Simpson	Operations Reactor Operator
Gene Richter	Operations Non-licensed Operator

Documents Reviewed

FLEX Support Guidelines (FSGs)

FSG 4201, "Flex Portable Diesel Pump Staging and Hose Connection," Rev. DRAFT

FSG 4301, "Spent Fuel Pool Makeup with FLEX Pump," Rev. DRAFT

FSG 4501, "Reactor Building Ventilation During FLEX Conditions," Rev. DRAFT

FSG 4502, "Control Room and Plant Admin Building Ventilation During FLEX Conditions," Rev. DRAFT

FSG 4503, "Emergency Filtration Train," Rev. DRAFT

Procedures

C.5-3203, "Use of Alternate Injection Systems for RPV Makeup," Rev. 16

8300-02, "External Flooding Protection Implementation to Support A. 6 Acts of Nature," Rev. 5

1478, "External Flood Monthly and Annual Surveillance," Rev. 12

C.4-I, "Plant Flooding," Rev. 13

4AWI-08.06.02, "Plant Key Control," Rev. 12

C.5-4401, "FLEX DC Load Shed," Rev. DRAFT

C.5-4402, "Stage and Connect FLEX 480V Portable Diesel Generator," Rev. DRAFT

C.5-4403, "FLEX Portable Diesel Generator Operation," Rev. DRAFT

C.5-4404, "Operate Essential Battery Chargers from FLEX Portable Diesel Generator," Rev. DRAFT

C.5-4405, "Stage and Connect 480V Portable Diesel Generator to Backfeed MCCs," Rev. DRAFT

C.5-4406, "Stage FLEX 120V Portable Diesel Generator," Rev. DRAFT

C.5-4501, "Reactor Building Ventilation During FLEX Conditions," Rev. DRAFT

C.5-4502, "Control Room and PAB Ventilation during FLEX Conditions," Rev. DRAFT

C.5-4503, "EFT Ventilation During FLEX Conditions," Rev. DRAFT

C.5-4504, "Lighting During FLEX Conditions," Rev. DRAFT

C.4-B.09.02.A, "Station Blackout," Rev 45

A.8-06.04, "Alternate Methods for Monitoring Rx Vessel and Containment Parameters," Rev. 0

B.06.02.02-05, "Generator Hydrogen Cooling System," Rev. 22

A.8-06.03, "Refueling Emergency Portable Diesel Powered Equipment," Rev. 1

4AWI-04.05-13, "Control of Items in the Spent Fuel Pool," Rev. 12

1137, "Special Nuclear Material Physical Inventory," Rev. 15

7182 "Spent Fuel Pool Level Instrumentation Maintenance," Rev. 0

C.4-C, "Shutdown Outside Control Room," Rev. 42

C.4-B.09.07.E, "Loss of Power to LC-107 OR MCC-114," Rev. 12

Operation Procedure (OP) 2030, "Control Room Log," Rev. 92-B

OP 2194, "EFT Daily Log Sheet and Admin Bldg Checks," Rev. 51-A

OWI-02.03, "Operator Rounds," Rev. 49

OP B.02.01-01, "Fuel Pool Cooling - Function and General Description of System," Rev. 9

OP B.02.01-03, "Fuel Pool Cooling - Instrumentation and Controls," Rev. 9

OP B.02.01-04, "Fuel Pool Cooling – References," Rev. 16

OP B.02.01-05, "Fuel Pool Cooling - System Operation," Rev. 45

Calculations/Analyses

PRA-CALC-14-003, "Monticello MAAP Thermal Hydraulic Calculations to Support Extended Loss of AC Power Mitigating Strategies," Rev. 0

Engineering Evaluation 0000023964, "FLEX 480V Diesel Generator Sizing," Rev. 0

Calculation 14-010, "MNGP Flex Storage Location Separation Report," Rev. 0

Engineering Evaluation, EE 23602, "RCIC NPSH Margin Evaluation," Rev. 0

Calculation 14-099, "125V D1 Battery FLEX Coping Time Analysis," Rev. DRAFT

Calculation 14-100, "125V D2 Battery FLEX Coping Time Analysis," Rev. DRAFT

Calculation 14-101, "250V D3 Battery FLEX Coping Time Analysis," Rev. DRAFT

Calculation 14-102, "250V D6 Battery FLEX Coping Time Analysis," Rev. DRAFT

Calculation 14-036, "250V D7 Battery FLEX Coping Time Analysis," Rev. DRAFT

Calculation 14-009, "FLEX Alternate Nitrogen Requirements," Rev. 1

Calculation 13-047, "Cycle 27 Monticello Specific EOP Calculations," Rev 1

Calculation 14-098, "Dose at SFP Level Instrument," Rev. 0

MOHR 1-0410-9.10, "MOHR SFP-1 Site-Specific Seismic Analysis Report: Xcel Energy Monticello Nuclear Generating Plant (Monticello)," Rev. 0

Vendor calculation S-12400-080-01, "Evaluation of the Mounting Brackets for the Spent Fuel Pool Level Probe Assembly," Rev. 0

Drawings

NF-36298-2, "DC Electrical Load Distribution One Line Diagram," Rev. 86

B.09.13-06, "Instrument AC and Uninterruptible AC Distribution System (Figures)," Rev. 6

NE-100346, "DIV I and II 120V Instrument AC Distribution Panel Schedules," Rev 76

NE-36771-5, "Schematic Diagram Y91 UPS and AC Distribution Panels Y94 and Y90," Rev. 79

NE-36771-6, "Distribution Panels Y90 AND Y94 Schedules," Rev. 81

080-351022488-WD-02, "Wiring Modification for P/N: ARR130HK150F Battery Chargers," Rev. 0

080-351022488-LD-02, "Layout Drawing for Battery Charger P/N: ARR130HK150F," Rev. 2

NF-36298-1, "Electrical Load Flow One Line Diagram," Rev. 107

NF-36298-2, "DC Electrical Load Distribution One Line Diagram," Rev. 86

NF-36499, "Reactor Building – Spent Fuel Storage Pool Wall Sections & Details," Rev. 4

NF-36775-C, "Monticello Nuclear Generating Plant Reactor Building Conduit & Trays Above EL.1027' – 8"," Rev. C (DRAFT)

Cable schedule EC23419-14NC04, "Monticello Nuclear Generating Plant New Cable Schedule," Rev. 0

Drawing NX-236814-1, "Spent Fuel Pool Level Instrumentation Probe Support," Rev. 0

Drawing NF-36499, "Reactor Building-Spent Fuel Storage Pool Wall Sections & Details," Rev. 4

Drawing NE-36942-6, "Spent Fuel Pool Level Instrumentation Schematic Diagram," Rev. 0

Drawing NF-36298-1, "Electrical One Line," Rev. 107

Other Documents

Caterpillar DG specification, C7.1-XQ200 (SEBU8713-06), dated August 2014

Xcel Energy, Monticello Nuclear Plant Submittal: "Caterpillar XQ200 200kW Standby Diesel Generator Set, Ziegler Power Systems"

Design Description Form, EC23478, Rev. 0

Program document, "Monticello FLEX Program Document," Rev. DRAFT

Monticello Updated Safety Analysis Report (USAR), Rev. 31

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

MOHR document 1-0410-1, "MOHR EFP-IL SFPI System Temperature and Humidity Test Report," Rev. 1

MOHR document 1-0410-5, "MOHR EFP-IL SFPI System Shock and Vibration Test Report," Rev. 0

MOHR document 1-0410-2, "MOHR FSP-1 Level Probe Assembly Materials Qualification Report," Rev. 2

MOHR 1-0410-7, "MOHR EFP-IL SFPI System Battery Life Report," Rev. 2

MOHR 1-0410-10, "MOHR EFP-IL SFPI System Power Interruption Report," Rev. 1

EC23419-NL-36240-43, "Panel Schedule L-48," Rev. 77

EC23419-NL-36240-68, "Panel Schedule L-92," Rev. 79

MOHR 1-0410-3, "MOHR EFP-IL SFPI System Proof of Concept Report," Rev. 0

NEDO-24083, General Electric Licensee Topical Report, "Recirculation Pump Shift Seal Leakage Analysis," November 1978

**Monticello
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
OI 3.1.2.2.A	Restocking supplies during flooding conditions.	Review procedures when developed.
OI 3.2.1.2.A	Primary system leakage from the recirculation pump seals and other sources.	Provide the manufacturer and model of installed recirculation pump seals.
OI 3.2.4.8.A	Loading/sizing calculations of portable diesel generator(s) and strategy for electrical isolation for FLEX electrical generators from installed plant equipment.	Provide the following: 1. Calculation for line losses (voltage drop), ampacity, effect of starting largest load on minimum bus voltage 2. Calculations / load evaluations for the One Megawatt FLEX Diesel Generator
CI 3.1.1.4.A	Regional Response Center resource delivery.	Provide a strategy for transportation of equipment to the site under the flooding scenario when the established local staging area is potentially flooded.
CI 3.1.5.3.A	Evaluate FLEX equipment at high temperatures that may exist inside plant structures and buildings.	Complete high temperature calculations for reactor core isolation cooling (RCIC) Room, Main Control Room (MCR), Battery Rooms, and Residual Heat Removal (RHR) rooms and verify acceptable temperatures.
CI 3.2.1.1.A	Analysis code benchmark information.	Provide justification for applicability of EPRI benchmarking information to Monticello.
CI 3.2.1.3.E	Evaluate sequence of event timing for establishing ventilation needs for various areas of the plant.	Provide calculations verifying timing of actions to establish ventilation.
CI 3.2.1.6.A	Nitrogen supply evaluation.	Provide revised calculation that reflects the new timeline value of 16 hours versus 20 hours, after accommodating the operation of the hardened vent.
CI 3.2.4.2.A	Calculations or supporting analysis regarding the effects of loss of ventilation in the RCIC room nor other areas of the plant (main control room (MCR) and battery room) when normal ventilation will not be available during the ELAP.	Provide room heatup calculations for RCIC Room, MCR, Battery Rooms and RHR Rooms.
CI 3.2.4.2.B	Habitability limits of the MCR will be maintained in all Phases of an ELAP.	Provide room heatup calculation for MCR.
CI 3.4.A	Minimum capabilities for offsite resources in accordance with NEI 12-06, Section 12.2.	Provide completed playbook for review.

Audit Item Reference	Item Description	Licensee Input Needed
AQ.38	Battery Room Ventilation - hydrogen gas strategy.	Provide calculation for battery room ventilation and confirm acceptable hydrogen concentration results.
AQ.65	Evaluate the effects of heightened temperatures on each battery's capability to perform its function for the duration of the ELAP event.	Provide calculation for battery room ventilation and confirm acceptable temperature results.
SFPI.5	Structural evaluation of SFPI mounting attachments.	Provide updated seismic calculation for NRC review.
SFPI.6	SFPI capability/reliability under all postulated conditions.	Provide heatup calculation for alternative shutdown system panel.
SFPI.11	SFPI maintenance, testing, and calibration.	Provide testing and calibration procedures.
SE.5	Human factors and FLEX strategies.	Provide justification that reliance on specific people to be available at six hours is acceptable or show how the plant will ensure that they will be available at six hours.
SE.8	Evaluate portable FLEX pump connections to RHRSW and confirm this change provides reasonable assurance that accessibility to at least one connection point utilizes seismically robust structures.	Provide evaluation of alternate path through a seismically robust structure.

Monticello

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

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

Audit Item Reference	Item Description	Action
CI 3.2.1.4.A	FLEX portable pump flow analyses.	NRC evaluate updated hydraulic calculation that was provided on ePortal after the onsite audit.
CI 3.2.2.B	FLEX portable pump supply to the SFP.	NRC evaluate updated hydraulic calculation that was provided on ePortal after the onsite audit.
AQ.24	Load shed and battery capability.	NRC audit battery vendor.
AQ.49	SFP makeup strategy and flow capability.	NRC evaluate updated hydraulic calculation that was provided on ePortal after the onsite audit.

The NRC staff's review to date led to issuance of the Monticello ISE and RAI dated October 28, 2013 (ADAMS Accession No. ML13275A187). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA 12 051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

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

In support of the ongoing audit of the licensee's OIPs as supplemented, the NRC staff conducted an onsite audit at Monticello from November 17 - 21, 2014, per the audit plan dated October 22, 2014 (ADAMS Accession No. ML14290A367). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

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

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

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

Docket No.: 50-263

Enclosure:

Audit report

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