



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

Region III
2443 Warrenville Road, Suite 210
Lisle IL 60532-4352

July 31, 2013

EA-13-079

Mr. Michael J. Pacilio
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO), Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: FINAL SIGNIFICANCE DETERMINATION OF A WHITE FINDING WITH ASSESSMENT FOLLOWUP AND NOTICE OF VIOLATION; NRC INSPECTION REPORT NO. 05000237/2013002, 05000249/2013002; DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

Dear Mr. Pacilio:

This letter provides you the final significance determination of the preliminary White finding discussed in our previous communication dated May 7, 2013, which included U.S. Nuclear Regulatory Commission (NRC) Inspection Report No. 05000237/2013002, 05000249/2013002. The finding involved the licensee's failure to establish a procedure addressing all of the effects of an external flooding scenario on the plant. Specifically, Dresden Nuclear Power Station (Dresden) procedure DOA 0010-04, *Floods*, did not account for reactor vessel inventory make-up during an external flooding scenario up to and including the probable maximum flood event which could result in reactor vessel water level lowering below the top of active fuel.

In letters dated June 6 and 21, 2013, and electronic mail dated June 6 and 21, 2013, you provided a response to the NRC staff preliminary determination regarding the finding. In your June 6, 2013, letter you agreed there was a performance deficiency; however, you requested that the significance determination be re-evaluated based on the additional information contained in your letter concerning the likelihood that reactor pressure vessel make-up would not be required during the flood, and the reasonable assumptions related to the likelihood that efforts to establish reactor pressure vessel make-up during and after the flood would be successful. Your subsequent letter and electronic mail provided additional risk information to further support your position.

The NRC determined that the additional information provided in your letters and electronic mail did not reduce the uncertainty in the quantitative risk evaluation and as a result, did not change the bounding quantitative risk evaluation. Your submittals did not address our evaluation of the most important qualitative decision-making attributes of defense-in-depth, safety margin, and the period of time the performance deficiency existed. As a result, our overall Significance Determination Process (SDP) evaluation remained unchanged.

Your responses provided an analysis of historical Dresden-specific and industry operating data on reactor pressure vessel leakage rates which were used to estimate the probability and rate of reactor pressure vessel leakage requiring make-up during a flood. The NRC determined that these data alone cannot be used to reliably predict leakage for this postulated event, which would involve a very complex plant shutdown involving inundation of the site with flood waters and extended station blackout conditions. The NRC concluded that the operational impacts of transitioning from full power operation to shutdown cooling operations and then to Mode 3 operation using the isolation condenser and at the same time securing plant systems prior to flood inundation as required by your flood response procedure could impact leakage probability and rates and affect the need for inventory make-up during the flood event. This postulated event represents a unique scenario that is not fully captured in historical plant operating experience.

Your letters and electronic mail also addressed the probability that reactor pressure vessel make-up would be successful during and after the flood. After the inspection finding was identified, Dresden Nuclear Power Station (DNPS) operators identified several potential reactor pressure vessel injection paths. The methods identified would be used in conjunction with the dedicated diesel-driven emergency make-up flood pump and temporary hoses during the flood event. Your evaluation concluded that the methods were feasible, and a human reliability analysis concluded that operators would have an 83 percent success rate in providing reactor pressure vessel inventory make-up.

The NRC could not conclude that the methods identified for reactor pressure vessel inventory make-up were feasible under the spectrum of plant conditions that could exist during a flood event. The lack of integrated procedures, combined with the lack of flood level predictive capabilities, could result in variable plant conditions at the onset of significant flood impacts. As an example, reactor pressure and reactor pressure vessel leakage rates could vary as a result of the significant reactor coolant system re-alignment activities required by the flood response procedure to shutdown the plant, establish shutdown cooling, flood the reactor vessel, restore reactor vessel water level, and transition to Mode 3 isolation condenser operations from Mode 4 operations. If leakage is much greater than 10 gallons per minute as assumed in your analysis or reactor pressure is higher in the Mode 3 pressure band, the methods identified for inventory make-up would not be feasible. Without assurance of feasibility under a spectrum of conditions, the reliability of the methods cannot be evaluated. Also, the simple NRC event tree used for modeling make-up to the reactor vessel during the flood event assumed that the failure of the strategy would be dominated by human error. A complete quantitative assessment would also require the evaluation of equipment failure probabilities and a dependency analysis for the many actions required in the flooding event, which for the proposed make-up strategies may not be insignificant. For these reasons, the bounding quantitative risk evaluation remained unchanged from the preliminary SDP assessment.

Therefore, after considering the information developed during the inspection and the additional information provided in your letters dated June 6 and 21, 2013, and electronic mail dated June 6 and 21, 2013, the NRC has concluded that the finding is appropriately characterized as White, a finding of low to moderate risk significance.

You have 30 calendar days from the date of this letter to appeal the staff's determination of significance for the identified White finding. An appeal must be sent in writing to the Regional

Administrator, Region III, 2443 Warrenville Road, Lisle, IL 60532-4352, and must address the criteria in NRC Inspection Manual Chapter 0609, Attachment 2, "Process for Appealing NRC Characterization of Inspection Findings (SDP Appeal Process)."

The NRC has also determined that the failure of Exelon Generation Company, LLC to establish a procedure addressing all of the effects of an external flooding scenario on the plant is a violation of Technical Specification 5.4.1 as cited in the enclosed Notice of Violation (Notice). The circumstances surrounding the violation were described in detail in NRC Inspection Report No. 05000237/2013002, 05000249/2013002. In accordance with the NRC Enforcement Policy, the Notice is considered escalated enforcement action because it is associated with a White finding.

The NRC has concluded that information regarding the reasons for the violation, the corrective actions taken and planned to be taken to correct the violation, and the date when full compliance was achieved, is already adequately addressed on the docket in NRC Inspection Report No. 05000237/2013002, 05000249/2013002. Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

As a result of our review of Dresden's performance, including this White finding, we have assessed the plant to be in the Regulatory Response column of the NRC's Action Matrix, effective the 1st quarter of 2013. Therefore, we plan to conduct a supplemental inspection using Inspection Procedure 95001, "Inspection for One or Two White Inputs in a Strategic Performance Area," when your staff has notified us of your readiness for this inspection. This inspection procedure is conducted to provide assurance that the root cause and contributing causes of risk significant performance issues are understood, the extent of condition and the extent of cause are identified, and the corrective actions are sufficient to prevent recurrence.

For administrative purposes, this letter is issued as NRC Inspection Report 05000237/2013009, 05000249/2013009. Additionally, apparent violations (AV) 05000237/2013002-02; 5000249/2013002-02 are now closed, and violations (VIO) 05000237/2013002-02; 05000249/2013002-02 are opened in their place.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response

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should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction. The NRC also includes significant enforcement actions on its Web site at <http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions>.

Sincerely,

/RA by A. Boland for/

Charles A. Casto
Regional Administrator

Docket No. 50-237; 50-249
License No. DPR-19; DPR-25

Enclosure:
Notice of Violation

cc w/encl: Distribution via ListServ

NOTICE OF VIOLATION

Exelon Generation Company, LLC
Dresden Nuclear Power Station, Units 2 and 3

Docket Nos. 50-237; 50-249
License Nos. DPR-19; DPR-25
EA-13-079

During an NRC inspection conducted from January 1 to March 31, 2013, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Technical Specification Section 5.4.1 requires, in part, that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978.

Regulatory Guide 1.33, Revision 2, Appendix A, Paragraph 6 addresses "Procedures for Combating Emergencies and Other Significant Events" and lists Item w "Acts of Nature (e.g., tornado, flood, dam failure, earthquakes)" as an activity under Paragraph 6 to be covered by written procedures.

Contrary to the above, from February 20, 1991, to November 21, 2012, the licensee failed to establish a written procedure to address the effect of an external flooding scenario on the plant. Specifically, prior to November 21, 2012, procedure DOA 0010-04, *Floods*, did not account for reactor vessel inventory make-up during an external flooding scenario up to and including the probable maximum flood event which could result in reactor vessel water level lowering below the top of active fuel.

This violation is associated with a White SDP finding.

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence, and the date when full compliance was achieved is already adequately addressed on the docket in NRC Inspection Report No. 05000237/2013002, 05000249/2013002 and in your letters dated June 6 and 21, 2013, and electronic mail dated June 6 and 21, 2013. However, you are required to submit a written statement or explanation pursuant to Title 10 of the Code of Federal Regulations Section 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation, EA-13-079" and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region III, and a copy to the NRC Resident Inspector at the Dresden Station, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

If you choose to respond, your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. Therefore, to the extent possible, the response

should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 31st day of July, 2013

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should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction. The NRC also includes significant enforcement actions on its Web site at <http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions>.

Sincerely,

/RA by A. Boland for/

Charles A. Casto
Regional Administrator

Docket No. 50-237; 50-249
License No. DPR-19; DPR-25

Enclosure:
Notice of Violation

cc w/encl: Distribution via ListServ

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¹ OE concurrence received via email from L. Casey on July 23, 2013.

Letter to Michael J. Pacilio from Charles A. Casto dated July 31, 2013

SUBJECT: FINAL SIGNIFICANCE DETERMINATION OF A WHITE FINDING WITH ASSESSMENT FOLLOWUP AND NOTICE OF VIOLATION; NRC INSPECTION REPORT NO. 05000237/2013009, 05000249/2013009; DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

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