



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
2100 RENAISSANCE BLVD., SUITE 100  
KING OF PRUSSIA, PA 19406-2713

October 27, 2014

EA-14-100

Mr. George Gellrich  
Site Vice President  
Calvert Cliffs Nuclear Power Plant, LLC  
Exelon Generation Company, LLC  
1650 Calvert Cliffs Pkwy  
Lusby, MD 20657-4702

**SUBJECT: FINAL SIGNIFICANCE DETERMINATION FOR A WHITE FINDING WITH ASSESSMENT FOLLOW-UP AND NOTICE OF VIOLATION [NRC INSPECTION REPORT NO. 05000318/2014010] – CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT 2**

Dear Mr. Gellrich:

This letter provides you the final significance determination for the preliminary White finding discussed in the U.S. Nuclear Regulatory Commission (NRC) letter dated August 8, 2014, and in the enclosed Inspection Report Numbers 05000317/2014003 and 05000318/2014003 (ML14219A624)<sup>1</sup>. This letter also transmits the follow-up NRC assessment of Exelon Generation Company, LLC, (Exelon) performance at the Calvert Cliffs Nuclear Power Plant (CCNPP), which supplements the NRC mid-cycle assessment letter issued on September 2, 2014 (ML14239A543).

As described in the August 8, 2014, NRC letter, Exelon identified a violation of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.54(q)(2), which, in part, requires a licensee to develop and maintain an emergency plan which meets the requirements of 10 CFR 50.47(b), and 10 CFR 50, Appendix E. Contrary to these requirements, from October 11, 2013, through March 4, 2014, CCNPP staff failed to maintain an emergency plan which met the standards of 10 CFR 50.47(b)(4) for Unit 2. Specifically, during the replacement of the Unit 2 main steam line radiation monitors (MSLRMs), CCNPP's staff inaccurately calculated the associated emergency action levels (EALs) effluent threshold values for the Alert, Site Area Emergency, and General Emergency (GE) classifications. These thresholds were subsequently incorporated into Table R-1, "Effluent Monitor Classification Threshold" of the EALs. This calculation error could have resulted in an over-classification of an event, an unnecessary protective action recommendation, and could have caused offsite response organizations to implement unnecessary protective actions for the public. The issue was entered into CCNPP's

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<sup>1</sup> Designation in parentheses refers to an Agency-wide Documents Access and Management System (ADAMS) accession number. Documents referenced in this letter are publicly-available using the accession number in ADAMS.

corrective action program, compensatory actions were implemented, and corrective actions to revise the EAL table were initiated.

In the August 8, 2014, letter transmitting the NRC preliminary determination and the inspection report, the NRC offered Exelon the option to attend a regulatory conference, to reply in writing to provide its position on the facts and assumptions the NRC used to arrive at the finding and its safety significance, or to accept the finding as characterized in the inspection report.

In a letter dated September 04, 2014, (ML14252A229), Exelon provided a written response to the NRC's preliminary determination. In the response, Exelon agreed with the finding, but disagreed with the preliminary White significance. Specifically, Exelon stated that the finding should be characterized as having very low safety significance because an over-classification of a GE that leads to the evacuation of people is less significant when compared to missing or delaying the classification of a GE and not evacuating the public in a timely manner. In addition, Exelon stated that the same plant conditions that could have led to an over-classification of a GE due to the inaccurate MSLRM EAL threshold, could have also resulted in an acceptable GE classification using CCNPP's Fission Product Barrier Matrix. A summary of the information provided by Exelon in its September 04, 2014, letter, and the NRC response, is provided in Enclosure 1.

The NRC carefully considered the information developed during the inspection and the information provided in Exelon's September 04, 2014, response letter. The staff utilized Inspection Manual Chapter (IMC) 0609, Appendix B, "Emergency Preparedness Significance Determination Process," to determine the significance of the finding. Using the examples provided in IMC 0609, Appendix B, the staff determined that the finding matched an example of a degraded risk-significant planning standard, which would be assessed as White. Specifically, the example states, in part, that the finding would be assessed at a White significance if the EAL classification process would result in an over-classification that would lead to off-site response organizations implementing, by procedure, unnecessary protective actions for the public. This condition should also be considered met if the licensee would make a protective action recommendation to the off-site response organizations because of the over-classification.

With respect to Exelon's point that the same set of plant conditions that would have led to an over-classification of a GE could have also resulted in an acceptable GE classification through assessment of the CCNPP's Fission Product Barrier Matrix in the EALs, the NRC reviewed and evaluated the information provided in the letter. The NRC acknowledges that the operators could have made an EAL classification based on the Fission Product Barrier Matrix. However, the NRC determined that given the indications provided by the MSLRMs and CCNPP processes and procedures, there is a strong likelihood that the operators would have declared a GE based on the MSLRM indications versus the Fission Product Barrier Matrix. Therefore, the NRC has concluded that the finding is appropriately characterized as White, a finding of low to moderate 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. Such appeals will be considered to have merit only if they meet the criteria given in the NRC Inspection Manual Chapter 0609, Attachment 2. An appeal must be sent in writing to the Regional Administrator, Region I, 2100 Renaissance Boulevard, King of Prussia, PA 19406.

The NRC has also determined that the finding involved a violation of 10 CFR 50.54(q)(2), "Condition of Licenses," as cited in the Notice of Violation (Notice) included as Enclosure 2. The circumstances surrounding the violation were described in detail in the subject inspection report. 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 the information regarding: (1) the reason for the violation; (2) the interim and long term corrective actions already taken and planned to correct the violation and prevent recurrence; and, (3) the date when full compliance was achieved, is already adequately addressed on the docket in NRC Inspection Report Numbers 05000317/2014003 and 05000318/2014003, in your letter dated September 04, 2014, and in this letter. Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your corrective actions or your position.

With respect to the supplemental NRC assessment of Exelon performance at Calvert Cliffs Unit 2, as a result of this White finding in the Emergency Preparedness Cornerstone, the NRC has assessed Calvert Cliffs Unit 2 to be in the Regulatory Response column of the NRC Action Matrix, retroactive to the second calendar quarter of 2014. 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 Exelon staff notify us of their readiness for this inspection. This inspection is conducted to provide assurance that the root cause and contributing causes of any performance issues are understood, the extent of condition is identified, and the corrective actions are sufficient to prevent recurrence.

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 located at NRC Headquarters in Rockville, MD, and from the NRC's Agency-wide 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, if you choose to provide one, should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions regarding this matter, please contact Mr. Daniel Schroeder, Chief, Projects Branch 1, Division of Reactor Projects in Region I, at (610) 337-5262.

Sincerely,

***/RA Vonna Ordaz for/***

David C. Lew  
Acting Regional Administrator

Docket Nos. 50-318  
License No. DPR-69

Enclosures: As stated

cc w/encl: Distribution via ListServ

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Sincerely,  
**/RA Vonna Ordaz for.**  
 David C. Lew  
 Acting Regional Administrator

Docket Nos. 50-318  
 License No. DPR-69

Enclosures: As stated

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## ENCLOSURE 1

### NRC RESPONSE TO INFORMATION PROVIDED IN THE EXELON GENERATION COMPANY, LLC (EXELON) LETTER DATED SEPTEMBER 4, 2014

#### SUMMARY OF EXELON'S POSITION REGARDING SIGNIFICANCE

In a September 4, 2014, letter, Exelon submitted "Response to the Preliminary White Finding in Inspection Report No. 50-317(318)/2014-003," dated September 4, 2014 (ML14252A229) for the NRC's review and consideration prior to reaching a final significance determination. Exelon concurs with the performance deficiency and the associated apparent violation as discussed in IR 50-317(318)/2014-003; however, Exelon disagrees with the characterization of the finding having low to moderate safety significance (White)

In support of this view, Exelon raised two points for NRC consideration. These points, and the NRC responses to each, are summarized below:

#### Exelon Point #1:

Based on documented studies regarding the ability to safely evacuate the public during an event, Exelon opines that an over-classification of a General Emergency (GE), one that requires the evacuation the public, has a less significant outcome when compared to missing or delaying the classification of a GE and not evacuating the public in a timely manner.

#### NRC Response

In accordance with NRC Inspection Manual Chapter 0609, Appendix B, "Emergency Preparedness Significance Determination Process, (EP SDP)" section 5.4, "10 CFR 50.47(b)(4), Emergency Classification System," an Emergency Action Level (EAL) is ineffective when it no longer results in a timely and accurate declaration for an initiating condition (IC). An EAL may be rendered ineffective by changes to facility procedures, systems, or equipment; errors in numeric thresholds; or any other cause that could result in an IC, which should be declared, not being declared in a timely and accurate manner following the change(s).

The NRC expects declarations to be timely and accurate. However, unnecessary public protective actions caused by an over-classification are a concern since the public could be placed at increased health risks without realizing the dose avoidance benefit of a necessary protective action. The NRC encourages conservative decision making in uncertain events. However, a licensee's emergency classification process should, to the extent possible, support timely and accurate declarations should an emergency occur. A deficient emergency classification process that would result in an over-classification and cause the licensee to make a protective action recommendation, or cause offsite response organizations (OROs) to implement protective actions (e.g., a nondiscretionary precautionary evacuation of schools on a Site Area Emergency) by procedure, should be identified as a degradation of a risk significant planning standard (RSPS) function.

Further, NRC Inspection Manual Chapter 0308, Attachment 3, Appendix B, "Technical Basis for Emergency Preparedness Significance Determination Process," Issue Date 12/19/2012, Section 4.3.2, "Deficient EAL Processes that Could Cause Over-classifications," states, "A finding associated with a deficient emergency classification process that would result in an over-classification and in OROs implementing unnecessary protective actions for the public would have White significance. The White significance is consistent with the emergency classification

function being degraded rather than lost (e.g., other EALs in scheme are effective) and the fact that the deficiency was identified during normal operations, rather than an emergency. The EP SDP applies this criterion only in cases in which the offsite response would be explicitly driven by ORO response procedures triggered by the declared classification (e.g., "...when the plant reports this, do this...") or the licensee makes an unnecessary protective action recommendation (PAR) to the OROs because of an over-classification.

In this case, the deficient emergency classification process would result in over-classification of the event for Alert, Site Area Emergency, and GE declarations and, in the case of the GE declaration, would result in a PAR being made to state and local authorities and OROs. This case is consistent with the guidance and examples provided in the EP SDP for a degradation of a RSPS function. The SDP considers degradation of a RSPS functions to be a White.

An evacuation of the public is not a risk free event. Evacuations of schools, day care centers, nursing homes, prisons, hospitals, and the general public create risk. This risk is acceptable when balanced by the benefits of dose avoidance to the public during a major radiological release event. However, an evacuation without the associated dose avoidance benefit places the public at risk unnecessarily. For this reason this over-classification scenario is considered a degradation of a RSPS function.

Exelon stated that it reviewed similar NRC findings for radiation monitor threshold errors, and that White findings have typically been assessed for incorrectly high thresholds. While Exelon did not provide specific examples of similar findings, the NRC reviewed similar findings and determined that this finding is consistent with similar applications of the EP SDP. For example, on July 1, 2014, the NRC issued a White Notice of Violation to Wolf Creek (EA-14-024) (ML14182A628), where a potential over-classification due to inaccurate Dose Assessment software could have resulted in an unnecessary GE Declaration and a PAR being made. A regulatory conference was held for the Wolf Creek case, and the NRC's decision was confirmed. This is an example of precedence which is most directly applicable to the Calvert Cliffs case.

#### Exelon Point #2:

The same set of plant conditions that would have led to the over-classification of a GE declaration as a result of the inaccurately low Unit 2 main steam line radiation monitor (MSLRM) EAL threshold values could have also resulted in an acceptable GE classification through assessment of the station's Fission Product Barrier Matrix in the EALs. This approach would require the use of operator judgment to determine the loss/potential loss of the fuel clad barrier, the loss of reactor coolant system, and the loss of the containment barriers due to specific, non-judgmental thresholds. Exelon believed this should be considered a mitigating factor.

#### NRC Response

The staff determined that mitigation credit was not supported or warranted in this case. Specifically, the staff determined that: 1) the EAL threshold for offsite radiological conditions indicated by the MSLRM would be met due to the erroneous threshold values; 2) the GE would be confirmed by an initial dose assessment as directed by the Calvert Cliff's Dose Assessment Procedure, which also incorporates the inaccurate EAL Threshold values and directs use of an overly conservative model; 3) if an emergency director were to apply judgment that the fuel clad was lost or potentially lost, they would rely upon the same information (MSLRM readings, erroneous EAL thresholds, and erroneous ERO dose assessment procedure based on of the

MSLRM readings) as a basis for that judgment; and 4) Section 5.4 of Appendix B to IMC0609 provides that EALs in other initiating conditions (e.g., the fission product barrier matrix) generally may not be credited as mitigating factors for an ineffective EAL in a different initiating condition (e.g., radioactive effluent).

Based on limited interviews conducted by Exelon of the Senior Reactor Operators and Shift Managers, the operators indicated that they would not have made a GE declaration based upon judgment given the information available to them. The NRC acknowledges that the station operators could have made a GE declaration based upon inaccurate information using the Fission Product Barrier Matrix and operator judgment. However, given the direct quantitative indication provided by the MSLRM exceeding the erroneous threshold accompanied with plant processes and procedures, there is a strong likelihood that station operators would have made a GE declaration based upon the MSLRMs. In that case, an over-classification of a GE would be declared and a PAR would be issued. A GE declaration based on the Fission Product Barrier matrix and operator judgment would erroneously confirm the GE declaration based upon the MSLRMs.

#### SUMMARY

The NRC staff reviewed Exelon's written response to the preliminary White Finding dated September 4, 2014. The NRC acknowledges and considered Exelon's viewpoint; however, the NRC staff's position is unchanged. The NRC Emergency Preparedness Significance Determination Process provides staff guidance on how an over-classification should be evaluated for risk significance. The NRC confirmed that the guidance was properly applied in this case.

Based upon the information provided, the NRC staff concluded that the issue should remain low to moderate safety significance (White).



ENCLOSURE 2  
NOTICE OF VIOLATION

Exelon Generation Company, LLC.  
Calvert Cliffs Nuclear Power Plant, LLC

Docket Nos. 50-138  
License Nos. DPR-69  
EA-14-100

During an NRC inspection conducted from April 1 – June 30, 2014, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

10 CFR 50.54(q)(2), requires that a holder of a nuclear power reactor operating license under this part, shall follow and maintain the effectiveness of an emergency plan that meets the requirements in Appendix E of this part and the standards in 10 CFR 50.47(b) and 10 CFR 50, Appendix E.

10 CFR 50.47(b)(4), requires a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and state and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.

10 CFR 50, Appendix E, Section IV.B.1, requires, in part, that the means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described, including Emergency Action Levels (EALs) that are to be used as criteria for determining the need for notification and participation of local and state agencies, the commission, and other federal agencies, and the EALs that are to be used for determining when and what type of protective measures should be considered within and outside the site boundary to protect health and safety. The EALs shall be based on in-plant conditions and instrumentation in addition to onsite and offsite monitoring.

Contrary to the above, from October 11, 2013, through March 4, 2014, Exelon failed to maintain in effect an emergency plan that met the standards in 10 CFR 50.47(b)(4) and the requirements in 10 CFR 50, Appendix E, Section IV.B.1 for Unit 2. Specifically, during the replacement of the Unit 2 main steam line radiation monitors (MSLRM), Exelon staff at Calvert Cliffs inaccurately calculated the effluent threshold for a General Emergency and incorporated the threshold into its Emergency Action Levels. This error could have resulted in an over-classification of an event, potentially resulted in an unnecessary protective action recommendation, and could have caused offsite response organizations to implement unnecessary protective actions.

This violation is associated with a White Significance Determination Process finding.

The NRC has concluded that the information regarding: (1) the reason for the violation; (2) the corrective actions taken and planned to correct the violation and prevent recurrence; and, (3) the date when full compliance was achieved, is already adequately addressed on the docket in NRC Inspection Report 05000317/2014003 AND 05000318/2014003, in your letter dated September 4, 2014, and in the letter transmitting this Notice of Violation (Notice). Therefore, you are not required to respond to this Notice. However, if the description therein does not

accurately reflect your corrective actions or your position you are required to submit a written statement or explanation pursuant to 10 CFR 2.201. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation – EA-14-100," 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 I, 2100 Renaissance Boulevard, Suite 100, King of Prussia, PA 19406, and a copy to the NRC Resident Inspector at Calvert Cliffs Nuclear Power Plant, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

If you choose to respond, your response will be made available electronically for public inspection in the NRC Public Document Room and from the NRC's Agency-wide 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. 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.

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

Dated this 27th day of October, 2014.