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10 CFR 50.54(q)(5)
10 CFR 50.4
10 CFR 72.44(f)

RS-20-126

October 13, 2020

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Braidwood Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456, STN 50-457, and 72-73

Subject: Exelon Generation Company Emergency Plan Addendum and Procedure Revisions

In accordance with 10 CFR 50.4(b)(5), *"Emergency plan and related submissions,"* Exelon Generation Company, LLC (Exelon) is submitting the Emergency Plan Addendum and Procedure revisions for Braidwood Station (Braidwood) listed in the table below.

Procedure No.	Revision	Title
EP-AA-1001, Addendum 3	4	*Emergency Action Levels for Braidwood Station*
EP-AA-1001, Addendum 3	5	*Emergency Action Levels for Braidwood Station*
EP-AA-1001, Addendum 3	6	*Emergency Action Levels for Braidwood Station*
EP-AA-111-F-02	I	*Braidwood PAR Flowchart*

The changes to the Emergency Plan Addendums and Procedure cited in the table were evaluated under the requirements of 10 CFR 50.54(q) and were determined not to result in a reduction in the effectiveness of the Emergency Plan for Braidwood. This notification is being submitted within 30 days of implementation of the changes as required by 10 CFR 50.54(q)(5). The changes continue to meet the applicable planning standards established in 10 CFR 50.47(b) and 10 CFR 50, Appendix E.

In addition, as required by 10 CFR 50.54(q)(5), this submittal includes a summary analysis of the changes to the noted Emergency Plan Addendum and Procedure (Attachment 1). This submittal also satisfies the reporting requirements associated with 10 CFR 72.44(f), which stipulates that within six months after any change is made to the Emergency Plan, the licensee shall submit a report containing a description of the changes to the Director, Division of Fuel Management, Office of Nuclear Material Safety and Safeguards.

A copy of the Emergency Plan Addendum and Procedure revisions are included in the attachments to this letter.

There are no regulatory commitments in this submittal.

If you have any questions or require additional information, please contact Amy Hambly at (630) 657-2808.

Respectfully,

Gullott, David M.

Digitally signed by Gullott, David M.
Date: 2020.10.13 10:36:10 -05'00'

David M. Gullott
Director, Licensing
Exelon Generation Company, LLC

Attachments:

1. 10 CFR 50.54(q)(5) Change Summary Analysis
2. EP-AA-1001, Addendum 3, Revision 4, *"Emergency Action Levels for Braidwood Station"*
3. EP-AA-1001, Addendum 3, Revision 5, *"Emergency Action Levels for Braidwood Station"*
4. EP-AA-1001, Addendum 3, Revision 6, *"Emergency Action Levels for Braidwood Station"*
5. EP-AA-111-F-02, Revision I, *"Braidwood PAR Flowchart"*

cc: w/ Attachment 1 only
Regional Administrator - NRC Region III
Director, NRC Division of Spent Fuel Management, ONMSS
NRC Senior Resident Inspector - Braidwood Station
NRC Project Manager, NRR - Braidwood Station
Illinois Emergency Management Agency - Division of Nuclear Safety

ATTACHMENT 1

10 CFR 50.54(q)(5) Change Summary Analysis

ATTACHMENT 1

10 CFR 50.54(q)(5) Change Summary Analysis

I. Document Titles

Exelon Generation Company, LLC (Exelon) has issued the following Emergency Plan Addendum and Procedure revisions for Braidwood Station (Braidwood):

- EP-AA-1001, Addendum 3, Revision 4, *"Emergency Action Levels for Braidwood Station"*
- EP-AA-1001, Addendum 3, Revision 5, *"Emergency Action Levels for Braidwood Station"*
- EP-AA-1001, Addendum 3, Revision 6, *"Emergency Action Levels for Braidwood Station"*
- EP-AA-111-F-02, Revision I, *"Braidwood PAR Flowchart"*

II. Description of Procedures

Emergency Plan Addendum (EP-AA-1001, Addendum 3)

The Emergency Plan Addendum listed (i.e., EP-AA-1001, Addendum 3) describes the Emergency Action Levels (EALs) implemented at Braidwood for entering Emergency Classification Levels (ECLs).

Emergency Plan Procedure (EP-AA-111-F-02)

The Emergency Plan Procedure listed (i.e., EP-AA-111-F-02) is a flowchart describing Protective Action Recommendations (PARs) related to the following:

- *Initial Protective Action Recommendation Only*
- *All Other General Emergencies Only*
- *Rapidly Progressing Severe Accident*
- *Hostile Action*

III. Description of Changes

EP-AA-1001, Addendum 3, Revision 4

The following changes were made under this revision to EP-AA-1002, Addendum 3.

1) The implementation guidance provided in Nuclear Energy Institute (NEI) 99-01, Revision 6, *"Development of Emergency Action Levels for Non-Passive Reactors,"* for EALs AG1, AS1, and AA1 (i.e., Exelon EALs RG1.1, RS1.1, and RA1.1) for the selection of a source term is as follows:

> *"Acceptable sources of this information include, but are not limited to, the RETS [Radiological Effluent Technical Specifications]/ODCM [Offsite Dose Calculation Manual], and values used in the site's emergency dose assessment methodology."*

While developers are cautioned to ensure that the method used for the selection of a source term results in a logical escalation in the ECL, they are only provided general guidance for the selection of a source term. As a result, Exelon legacy sites have used an Offisite Dose Calculation Manual (ODCM) source term that contains only noble gas components. The guidance in NEI 99-01, Revision 6, recognizes the ODCM as an acceptable source for this information. Emergency Preparedness Frequently Asked Question (EPFAQ 2015-009 was written in response to the use of a noble gas only source term and recommends that licensees consider iodine radionuclides within their source term. Establishing the reading of a radiation monitor corresponding to an EAL threshold relies on the assumption of parameters that would be extremely difficult to know at the time the threshold is being determined, but upon further consideration, to reach the release rates described in EALs RG1, RS1 and RA1 Initiating Conditions (ICs) would require an accident level severity source term. This accident source term would be expected to include non-noble components such as iodine radionuclides. When using an accident level source term, iodine radionuclides are in the release stream and will contribute to the Committed Effective Dose Equivalent (CEDE) and Committed Dose Equivalent (CDE) dose identified in the IC. Based on this, Exelon has chosen to recalculate the threshold values for EALs RA1.1, RS1.1 and RG1.1 using an accident source term described in the widely accepted industry standard document, NUREG-1940, "RASCAL 4: Description of Models and Methods." The revised threshold values, using the accident source term, are calculated in EP-EAL-0601, Revision 4, "Calculation of Braidwood Table R-1 Gaseous Effluent Monitor EAL Threshold Values." The revised calculations ensure the potential significant radionuclides in the release stream will be considered. The revisions included in EP-EAL-0601, Revision 4, have been reviewed and approved in accordance with Braidwood Station and Exelon processes and procedures. The revised threshold values remain in agreement with the guidance contained in NEI 99-01, Revision 6. The recalculation of these threshold values has also required the recalculation of the Unusual Event EAL RU1.2 threshold value to ensure proper escalation, since the current value was above the newly calculated EAL RA1.1 threshold value using the accident source term. This would follow the guidance in NEI 99-01, Revision 6, as follows:

> *"Depending upon the methodology used to calculate the EAL values, there may be overlap of some values between different ICs. Developers will need to address this overlap by adjusting these values in a manner that ensures a logical escalation in the ECL."*

The new threshold calculation for EAL RU1.2 is also contained in EP-EAL-0601, Revision 4. The adjustment of the EAL RU1.2 EAL threshold value remains in agreement with the guidance provided in NEI 99-01, Revision 6.

2) The calculation that establishes the threshold value for the Containment radiation monitor reading for EALs FC3.1, Loss Threshold, and EAL CT3, Potential Loss Threshold, was revised. These threshold values are described in NEI 99-01, Revision 6. The Loss Threshold (i.e., EAL FC3.1), is described as equating to 2% to 5% fuel clad damage. Exelon has chosen to use 2% fuel clad damage to express the Loss Threshold value. The Potential Loss Threshold (i.e., EAL CT3) is described in NEI 99-01, Revision 6, as equating to 20% fuel clad damage, which is the newly established value. The threshold values were revised to account for a change in the Core Damage Assessment Model (CDAM) program. This change essentially changes the relationship between core damage and Containment radiation monitor

response from a logarithmic to a linear relationship. The change in the CDAM program is in response to EPFAQ 2015-010. This EPFAQ describes the core damage vs. Containment radiation monitor response relationship as having both linear and logarithmic characteristics. Exelon has determined that the best way to reflect this relationship in the CDAM program is in a linear fashion. This change required a recalculation of the EAL FC3.1 threshold and the EAL CT3 threshold values. Calculation EP-EAL-0717, *"Criteria for Choosing Containment Radiation Values Indicating a Loss of Fuel Clad and a Potential Loss of Containment,"* was developed and utilizes the CDAM program to determine the threshold values, which is the same method used today with the present values. The calculation contains CDAM reports providing the assumptions made and the radiation monitor reading corresponding to both 2% and 20% fuel clad damage.

3) A correction was made to the Note in the Hot and Cold Reference Matrices for EAL RA3 to be consistent with the wording in the Basis section for EAL RA3. The Note was revised as follows:

   Changed from:

   "If the equipment in the listed room or area was already inoperable, or out of service, before the event occurred, then no emergency classification is warranted."

   Changed To:

   "If the equipment in the room or area listed in Table R3 was already inoperable, or out of service, before the event occurred, then no emergency classification is warranted."

   This change is considered administrative in nature and is consistent with the changes previously approved by the NRC for adopting the NEI 99-01, Revision 6, guidance.

4) In addition, a change to the PAR flowchart (i.e., EP-AA-111-F-02, Revision I, *"Braidwood PAR Flowchart,"* was made to match the corresponding EAL CT3, Potential Loss Threshold, for the Rapidly Progressing Severe Accident (RPSA) determination.

<u>EP-AA-1001, Addendum 3, Revision 5</u>

The following changes were made under this revision to EP-AA-1004, Addendum 3.

By letter dated February 14, 2020, the NRC issued Nos. 205 and 205 to Renewed Facility Operating License Nos. NPF-72 and NPF-77 for Braidwood, Units 1 and 2, respectively. These amendments approved changes submitted in a license amendment request dated March 1, 2019, for revising EALs based on adopting certain NRC-accepted Emergency Preparedness Frequently Asked Question (EPFAQ) guidance.

This revision to EP-AA-1001, Addendum 3, implements the changes as approved by the NRC in its letter and supporting Safety Evaluation Report (SER) dated February 14, 2020. The changes associated with this revision are considered "conforming changes" and prior NRC approval is not required to support implementation since the changes have already been approved. NRC

Regulatory Guide (RG) 1.219, *"Guidance on Making Changes to Emergency Plans for Nuclear Power Reactors,"* states the following regarding "conforming changes":

> *The licensee should screen all proposed changes to the emergency plan to determine whether a 10 CFR 50.54(q) evaluation is necessary and to determine whether another formal change process is applicable. The purpose of this screening is not to decide which proposed changes could reduce effectiveness but instead whether a 10 CFR 50.54(q) change evaluation is necessary. The licensee should screen each proposed change separately and reserve the treatment of changes collectively for (1) repetitive identical changes, (2) editorial or typographical changes such as formatting, paragraph numbering, spelling, or punctuation that do not change intent, (3) conforming changes, or (4) two or more elements that are interdependent (e.g., a change to one element compensates for a change to another element). The licensee should document this screening if it concludes that a 10 CFR 50.54(q)evaluation is not necessary.*

Therefore, this change is consistent and supported by the guidance related to a "conforming change."

<u>EP-AA-1001, Addendum 3, Revision 6</u>

The following changes were made under this revision to EP-AA-1001, Addendum 3.

By letter dated July 31, 2020, the NRC issued Amendment Nos. 213 and 213 to Renewed Facility Operating License Nos. NPF-72 and NPF-77 for Braidwood, Units 1 and 2, respectively. These amendments approved changes submitted in a license amendment request dated August 23, 2019, for revising EAL RA3.1 to remove specific references to radiation monitoring instrumentation used for monitoring radiation levels in the Main Control Room (MCR) as the only entry condition into the EAL.

This revision to EP-AA-1002, Addendum 3, implements the changes as approved by the NRC in its letter and supporting SER dated July 31, 2020. The changes associated with this revision are considered "conforming changes" and prior NRC approval is not required to support implementation since the has already approved the changes. NRC RG 1.129 states the following regarding "conforming changes":

> *The licensee should screen all proposed changes to the emergency plan to determine whether a 10 CFR 50.54(q) evaluation is necessary and to determine whether another formal change process is applicable. The purpose of this screening is not to decide which proposed changes could reduce effectiveness but instead whether a 10 CFR 50.54(q) change evaluation is necessary. The licensee should screen each proposed change separately and reserve the treatment of changes collectively for (1) repetitive identical changes, (2) editorial or typographical changes such as formatting, paragraph numbering, spelling, or punctuation that do not change intent, (3) conforming changes, or (4) two or more elements that are interdependent (e.g., a change to one element compensates for a change to another element). The licensee should document this screening if it concludes that a 10 CFR 50.54(q)evaluation is not necessary.*

Therefore, this change is consistent and supported by the guidance related to a "conforming change."

IV. Description of How the Changes Still Comply with Regulations

EP-AA-1001, Addendum 3, Revision 4

1) Release rates described in EALs RG1, RS1 and RA1 ICs would require an accident level severity source term. This accident source term would be expected to include non-noble components such as iodine radionuclides. Based on this, Exelon has chosen to recalculate the threshold values for EALs RA1.1, RS1.1 and RG1.1 using an accident source term described in the widely accepted industry standard document (i.e., NUREG-1940, "RASCAL 4: Description of Models and Methods"). The revised threshold values, using the accident source term, are calculated as noted in EP-EAL-0601. The revised calculations ensure that the potential significant radionuclides in the release stream will be considered.

   The recalculation of the above threshold values also required the recalculation of the Unusual Event EAL RU1.2 threshold value to ensure proper escalation path, since the current value was above the newly calculated EAL RA1.1 threshold value using the accident source term. This change follows the guidance of NEI 99-01, Revision 6.

   Updating the EAL threshold values based on the technical basis changes as noted above in Section III does not alter the meaning or intent of the approved EALs. The changes remain consistent with the guidance provided in NEI 99-01, Revision 6, as approved by the NRC and follow the applicable guidance in NRC RG 1.219.

2) The threshold values for EALs FC3.1 and CT3 were revised to account for a change in the CDAM program as noted above in Section III and essentially change the relationship between core damage and Containment radiation monitor response from a logarithmic to a linear relationship. The change in the CDAM program is in response to EPFAQ 2015-010, which describes the core damage vs. Containment radiation monitor response relationship as having both linear and logarithmic characteristics. Exelon has determined that the best way to reflect this relationship in the CDAM program is in a linear fashion. The change required a recalculation of the threshold values for EALs FC3.1 and CT3. To support this, Calculation EP-EAL-0717 was developed and utilizes the CDAM program to determine the threshold values. The calculation contains CDAM reports providing the assumptions made and the radiation monitor readings corresponding to both 2% and 20% fuel clad damage.

   Updating the EAL threshold values based on the technical basis changes as noted above in Section III does not alter the meaning or intent of the approved EALs. The changes remain consistent with the guidance provided in NEI 99-01, Revision 6, as approved by the NRC and follow the applicable guidance in NRC RG 1.219. Additionally, the changes continue to meet applicable regulations requirements and commitments to the NRC.

3) Revising the Note in the Hot and Cold Matrices for EAL RA3 as noted above in Section III does not alter the meaning or intent of the approved EAL. This change is considered administrative in nature and is consistent with changes previously approved by the NRC for

adopting the EAL guidance in NEI 99-01, Revision 6. Additionally, the changes continue to meet applicable regulations requirements and commitments to the NRC.

4) 10 CFR 50.47(b)(10) states in part:

"A range of protective actions has been developed for the plume exposure pathway EPZ for emergency workers and the public…. "

In addition, NUREG-0654, Section II.J, states in part:

"Each licensee shall establish a mechanism for recommending protective actions to the appropriate State and local authorities…."

The PARs implemented in EP-AA-111 were developed based on instructions from NUREG-0654/FEMA-REP-1, Revision 1, Supplement 3, *"Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in support of Nuclear Power Plants."* Supplement 3 defines a Rapidly Progressing Severe Incident as a *"General Emergency with rapid loss of containment Integrity (emergency action levels indicate containment barrier loss) and a loss of ability to cool the core."* The definition is further refined EPFAQ 2013-004, Final Response, Question 1. Question 1 defines a RPSA as follows:

1. *This protective action recommendation is the first after a General Emergency has been declared*

AND

2. *There is a loss of the containment barrier per the Emergency Action Levels*

AND

3. *Either of the following*

    a. *Greater than or equal to Containment High Range Area Radiation Monitor Potential Loss EAL Threshold (20% Clad Damage)*

    OR

    b. *A significant radiological release (greater than PAGs at boundary) in about an hour*

The change to the PAR flowchart for Braidwood (i.e., EP-AA-111-F-02) as described above in Section III was made to match the corresponding EAL CT3, Potential Loss Threshold, for the RPSA determination. This change will ensure continued compliance with the definition of RPSA. The requirements of Planning Standard 10 CFR 50.47(b)(10) continue to be maintained. The change is also consistent with Program Element NUREG-0654, Section II.J, guidance and the guidance in NUREG-0654/FEMA-REP-1, Revision 1, Supplement 3, and EPFAQ 2013-004, Final Response, Question 1. Additionally, the change continues to meet applicable commitments to the NRC.

EP-AA-1001, Addendum 3, Revision 5

Planning Standard 10 CFR 50.47(b)(4) states in part: "*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."* In addition, Program Element guidance in NUREG-0654, Section II.D.1, states in part: "*An emergency classification and emergency action level scheme as set forth in Appendix 1 must be established by the licensee. The specific instruments, parameters or equipment status shall be shown for establishing each emergency class, in the in-plant emergency procedures. The plan shall identify the parameter values and equipment status for each emergency class."*

The changes made to the EALs in this revision of EP-AA-1004, Addendum 3, as described in Section III above reflect the implementation of Amendment Nos. 205 and 205 for Braidwood, Units 1 and 2, as approved by the NRC in its letter and supporting SER dated February 14, 2020. The applicable emergency preparedness regulations and commitments to the NRC continue to be met.

EP-AA-1001, Addendum 3, Revision 6

Planning Standard 10 CFR 50.47(b)(4) states in part: "*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."* In addition, the Program Element guidance in NUREG-0654, Section II.D.1, states in part: *"An emergency classification and emergency action level scheme as set forth in Appendix 1 must be established by the licensee. The specific instruments, parameters or equipment status shall be shown for establishing each emergency class, in the in-plant emergency procedures. The plan shall identify the parameter values and equipment status for each emergency class."*

The changes made to EAL RA3 in this revision of EP-AA-1001, Addendum 3, as described in Section III above implement Amendment Nos. 213 and 213 for Braidwood, Units 1 and 2, and reflect the changes as approved by the NRC in its letter and supporting SER dated July 31, 2020. The applicable emergency preparedness regulations and commitments to the NRC continue to be met.

Summary

Applicable regulatory commitments made to the NRC continue to be met. Existing requirements and capabilities under the Emergency Plans were not deleted or reduced and applicable regulatory requirements established in 10 CFR 50.47, 10 CFR 50, Appendix E, and the Program Element guidance of NUREG-0654 continue to be met.

V. Description of Why the Changes are Not a Reduction in Effectiveness (RIE)

Based on the changes described in Sections III and IV above, the emergency response capabilities are maintained and are not adversely impacted. The changes made under these revisions are consistent with changes previously approved by the NRC and were determined not to require prior NRC approval since some involved "conforming changes." Some of the changes were also consistent with the guidance specified described in RG 1.219. Applicable emergency

preparedness regulatory commitments made to the NRC and applicable regulatory requirements established in 10 CFR 50.47, 10 CFR 50, Appendix E, and the Program Element guidance of NUREG-0654 continue to be met. Therefore, the changes described do not constitute a reduction in effectiveness of the Emergency Plan for Braidwood.

ATTACHMENT 2

Radiological Emergency Plan Addendum Revision

EP-AA-1001, Addendum 3, Revision 4, *"Emergency Action Levels for Braidwood Station"*

ATTACHMENT 3

Radiological Emergency Plan Addendum Revision

EP-AA-1001, Addendum 3, Revision 5, *"Emergency Action Levels for Braidwood Station"*

ATTACHMENT 4

Radiological Emergency Plan Addendum Revision

EP-AA-1001, Addendum 3, Revision 6, *"Emergency Action Levels for Braidwood Station"*

ATTACHMENT 5

Radiological Emergency Plan Procedure Revision

EP-AA-111-F-02, Revision I, *"Braidwood PAR Flowchart"*