

## NRR-PMDAPEm Resource

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**From:** Wiebe, Joel  
**Sent:** Tuesday, April 21, 2015 5:05 PM  
**To:** Joseph Bauer; Jessica Krejcie  
**Cc:** David Gullott  
**Subject:** RE: Braidwood and Byron Stations Preliminary RAIs Regarding Utilization of WCAP-16143-P

This e-mail confirms my discussion with David Gullott on April 13, 2015. No proprietary information is contained in the RAIs and no clarification call is needed. A response will be provided by May 28, 2015.

Joel

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**From:** Wiebe, Joel  
**Sent:** Monday, April 06, 2015 1:02 PM  
**To:** Joseph Bauer; Jessica Krejcie  
**Subject:** Braidwood and Byron Stations Preliminary RAIs Regarding Utilization of WCAP-16143-P

The purpose of preliminary RAIs is to verify that they do not include any proprietary information and that they are clear and understandable. A response regarding proprietary information and whether or not a clarification call is needed is requested within 2 weeks.

In reviewing the Exelon Generation Company, LLC's (Exelon's) submittal dated October 16, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML14289A580), related to utilizing WCAP-16143-P for the Braidwood Station (Braidwood), Units 1 and 2 and Byron Station (Byron), Unit Nos. 1 and 2, the NRC staff has determined that the following information is needed in order to complete its review:

### RAI-1

In WCAP-16143-P, Revision 1, Figure E-6, "Crack Driving Force as a Function of Flaw Size: Circumferential Outside Surface Flaw in the Torus to Flange Region Weld with All Studs Intact (Flaw Length/Flaw Depth=6)," the NRC staff notes that the next time period of applied stress intensity factor (K) distribution is for "t = 1 second", which are for the axial stress results at Cut 3 for time = 1 second in Table F-1, "Stress for Upper Head to Flange Transition Region from Three-Dimensional Finite Element Model." Confirm that the ambient temperature (the expected inside containment temperature), and therefore the starting steady state uniform temperature, used in the finite element model is the same as the listed coolant temperature for time = 1 second in Table F-1. The concern is that if the starting steady temperature used is 60°F, then the metal temperature would hardly change after 1 second after the metal comes in contact with the coolant at the temperature listed for time = 1 second in Table F-1, in which case the calculated fracture toughness (KIC) value after 1 second would be a value close to the KIC value at the assumed boltup temperature of 60°F, and the bounding applied K distribution may not be the boltup case, but some time a little after (since the applied K distribution is higher as shown in Figure E-6).

### RAI-2

The NRC staff notes that during heatup and cooldown for the missing stud case, the load due to pressure that had been taken by the missing stud was redistributed to the nearby studs, most likely to the two studs immediately adjacent to the missing stud. Intuitively, the stresses in the flange location in question at the stud cut plane immediately adjacent to the missing stud cut plane (at the 6.66° cut plane shown in Figure E-3 "Upper Head/Flange Region Stress Cut Planes") would be higher than those in the same cut plane for the case where there is no missing stud. In order to allow verification of the fidelity of the finite element analysis results, identify the stresses in the flange in the center-of-stud cut plane (6.66° cut plane) after the 0° cut plane.

### RAI-3

In order to make a finding regarding Braidwood's and Byron's continued eligibility for the exemption from 10 CFR 50, Appendix G.IV.2.c., the NRC staff requires additional information regarding the probability of detection (POD) values reported in Sections E.5.1 "Missing Stud Results" and E.5.2 "All Studs Intact Results" of WCAP-16143-P, Revision 1. The NRC staff understands that the licensee considered the POD distributions from both the pass plus failed candidates and passed only candidates, and that the reported POD values are from the most limiting POD distribution. Identify which POD distribution best represents the personnel performing the ultrasonic testing (UT) examinations at the Braidwood and Byron Stations, Units 1 and 2. Also discuss the adequacy of the POD values reported in Sections E.5.1 and E.5.2 of WCAP-16143-P, Revision 1 for the manual UT examination to support that flaw depths of 0.43 inch and 0.32 inch have not been and will not be missed.

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