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Ms. Cindy Bladley, Chief
Rules, Announcements, and Directives Branch (RABD)
Division of Administrative Services
Office of Administration
Mail Stop: TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Response to Request for Comments Concerning Draft NUREG-XXXX, Revision 0, *"Common-Cause Failure Analysis in Event and Condition Assessment: Guidance and Research"* (Federal Register Notice 76FR67764, dated November 2, 2011) (Docket ID NRC–2011–0254)

Exelon Generation Company, LLC (Exelon) is submitting this letter in response to the Nuclear Regulatory Commission's (NRC's) request for comments concerning Draft NUREG-XXXX, *"Common-Cause Failure Analysis in Event and Condition Assessment: Guidance and Research."*

This draft NUREG offers guidance for assessing Common-Cause Failure (CCF) potential at the level of the observed performance deficiency, provides essential definitions of technical terms, and describes the treatment of CCF for a number of categories of component failures and outages. The draft NUREG also describes technical issues with both the consensus CCF model used in probabilistic risk assessments conducted in the United States and the associated parameter estimates and the data upon which they are based.

Exelon appreciates the opportunity to comment on draft NUREG-XXXX and offers the attached comments for consideration by the NRC.

If you have any questions or require additional information, please do not hesitate to contact Mr. Richard Gropp at 610-765-5557.

Respectfully,

D. P. Helker

David P. Helker
Manager - Licensing
Exelon Generation Company, LLC

Attachment

E-RIDS = ADM-03
Add = S. Long-Hua (shs)

SUNSI Review Complete
Template = ADM-013

Comments Concerning Draft NUREG-XXXX
"Common-Cause Failure Analysis in Event and Condition Assessment: Guidance and Research"

Exelon Generation Company, LLC (Exelon) performed a detailed review of draft NUREG-XXXX, *"Common-Cause Failure Analysis in Event and Condition Assessment: Guidance and Research."* Based on this review, Exelon offers the following comments for consideration by the NRC.

Editorial Comments

1. Section 1.3, *Definitions and Discussions* (page 7) - In the middle of the page, the equation being discussed is missing from the document.

2. Section 3, *Issues with Current CCF Modeling and Data Analysis Relevant to ECA* (Various Subsections) - In various subsections Equations 3.6 and 3.7 (i.e., Eq. 3.6 and Eq. 3.7) are discussed in the text, but the equations are labeled with a single number (e.g., (3)).

General Comments

Exelon believes that the suggested use of the conditional *Common-Cause Failure* (CCF) (i.e., the alpha-factor) in *Event and Condition Assessment* (ECA) might be flawed. The draft NUREG states that the full conditional CCF probability should be applied to all components in the group with the failed component, regardless of the details or cause associated with the failure. Exelon's concern with this approach is that the conditional CCF probabilities (i.e., alpha factors) used in Probabilistic Risk Assessment (PRA) and Standardized Plant Analysis Risk (SPAR) models include all inter-component dependencies not captured explicitly in the models.

As discussed in Section 1.1, *PRA Treatment and Dependent Failure*, the CCF parameters include multiple failures of components that: *"span a wide range, and may include common design, manufacture, testing, maintenance, environment, and many others."* The draft NUREG attempts to provide a supporting position to justify that the potential shared failure is at a causal level (e.g., a deficiency in a maintenance process) as opposed to a failure mechanism. While there is merit in this argument, the draft NUREG does not acknowledge that the other causes included in the CCF probabilities did not affect the component that failed. For example, if the cause is a deficient maintenance program, common-cause due to environment and design do not apply. However, the CCF probabilities include all these causes. The draft NUREG mentions that the impact of this assumption may be conservative or non-conservative, but does not seem to justify why the entire CCF probability should be used. While the draft NUREG describes that the industry is incorrect in trying to define the cause too, it suggests a method that assumes all causes of CCFs are applicable. Exelon does not necessarily agree with this assumption, since this might tend to increase the impact of common-cause.

In using the full CCF probability, the ECA penalizes licensees in cases where the CCF probability is actually lower than the value used in the PRA model. Because of the relatively high values (see note below) for CCF probabilities, it is likely that CCF will be a significant contributor and drive the results into higher action categories (e.g., White, Yellow). Even if the CCF probability used in the ECA is non-conservative (i.e., there is a stronger causal link than average, due to the nature of the deficiency and the historic events), the underestimation of risk is expected to be less than the overestimation using the suggested approach discussed in the

Comments Concerning Draft NUREG-XXXX
"Common-Cause Failure Analysis in Event and Condition Assessment: Guidance and Research"

draft NUREG. This is because of the relatively high alpha-factor values and the corresponding numerical impacts of CCFs on the final results.

> NOTE – There appears to be some inconsistency between Section 1.1, *Definitions and Discussions* (page 6), first paragraph, and the information discussed above. This is based on the statement in the draft NUREG definition that the *"potential for failure does not need to be high."* CCF probabilities on the order of <0.05 should not be considered low, when compared to most independent failure probabilities (e.g., diesel generators are an exception) which are on the order of <0.001. In fact, when comparing alpha-factors to independent component failure probabilities, many alpha-factors would be considered "high."

Furthermore, there are several items discussed in the draft NUREG which result in higher CCF probabilities, making application of the full CCF probability to all components in the Common-Cause Component Group (CCCG) conservative:

- The inclusion of incipient failures in the CCF probability calculations. Events that do not represent an actual failure, but may have been a CCF, are used in the CCF probabilities. Although not assigned a full failure, they bias the results in a conservative direction.

- The prior distributions are statistically manipulated to account for what is perceived to be fewer complete CCF events than represented by the data (referenced in Section 3.2.2). This results in the CCF probabilities being larger than the historical data indicates.

Finally, several statistical issues are raised on the "accuracy" of the CCF probabilities, which may result in conservative or non-conservative assessments. As discussed previously, the conservatisms will tend to have more impact on the results than the non-conservatisms. This is unfortunate in a "risk-informed" process that results in enforcement actions on licensees, where the result of the Significance Determination Process (SDP) calculation is generally used, without consideration for other factors, to determine the significance of the event.