Program Management Office
1000 Westinghouse Drive
Cranberry Township, PA 16066

Project 694

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Sunil D. Weerakkody, Chief
PRA Operational Support Branch
Division of Risk Assessment
Office of Nuclear Reactor Regulation

Subject: **Comments on the Risk Assessment Standardization Project (RASP) Handbook Volume One – Internal Events, Revision 2, PA-RMSC-0737**

The purpose of this letter is to provide comments from the PWROG on the NRC revisions to the RASP Handbook Volume 1 on the use of RASP Handbook guidance for NRC Significance Determination Process (SDP), Accident Sequence Precursor (ASP) and Management, Directive 8.3 event assessments. We appreciate NRC's willingness to discuss this with the industry and look forward to the discussions being held on May 13, 2013.

Please feel free to direct any questions to Roy Linthicum at roy.linthicum@exeloncorp.com or me at njstring@southernco.com.

Sincerely,

Norman J. Stringfellow

Jack Stringfellow, Chairman
PWR Owners Group

NJS:TZ:rfn

Attachments (1)

cc: Ken Kiper, NextEra
Ray Fine, FENOC
S. Levinson, AREVA
A. Maioli, W
R. Schneider, W
D. McCoy, W
E. Luengas, Luminant
M. Schwartz, W
R. Linthicum, Exelon
T. Schiffley, Exelon
R. Rishel, Duke
R. Bell, GE
K. McCall, GE

Comments on NRC RASP Handbook
Revision 2.0

The Nuclear Regulatory Commission (NRC) has issued Revision 2 to Volume 1 of the Risk Assessment of Operational Events Handbook, also known as the RASP Handbook. This Handbook provides methods and guidance to the NRC staff for performing risk assessment of operational events. The NRC has encouraged comments on the Handbook be provided to support preparation for a public meeting scheduled for May 13, 2013.

This revision has addressed many of the comments provided by the PWROG on the initial version of the Handbook. However, some issues remain as reflected in the general, specific, and editorial comments on the Handbook that are provided for consideration.

General Comments

The Handbook documents the methods and guidance that are used to perform an event and condition assessment (ECA). As a result of the assumptions made to support an ECA, several sources of uncertainty can be introduced into the quantification results. There is a lack of guidance on the treatment of uncertainties. The inclusion of guidance on the treatment of uncertainties for an ECA would be beneficial.

In general, the CCF section provides clearer and more reasonable guidance to the analyst. The explicit statement that all single failures should be considered as a "common cause failure" has been removed.

We would like to have further discussions regarding the basis for converting an initiating event analysis into an SDP. On the surface, this appears to be excessively conservative and doesn not take into consideration any possible fault exposure time.

Specific Comments

[Section 2.5, pg. 16] – Footnote 6 states that "For the case where the inception time is not known, the case '(run times) > PRA mission time (24 hours), inception time known or not known' would apply." This could be interpreted as directing the analyst to apply an exposure period of more than one year if 24 hours of operation had not been accumulated within the year prior to the discovery of the performance deficiency. The note should clarify that exposure period greater than one year should not be used, as directed in Section 2.7.

[Section 3.2, pg. 22] – Under "Unknown classification of severity," it is stated that "For cases where the judgment of the analyst is important to the analysis results, it could be incorporated explicitly into the analysis quantification as a source of uncertainty." As noted in the general comment above, the consideration of uncertainty can be important in understanding the results of the event assessment. Therefore, it is recommended that this statement be revised in future revisions to state that "For cases where the judgment of the analyst is important to the analysis results, it should be incorporated explicitly into the analysis quantification as a source of uncertainty."

[Section 4.3, pg. 28] – The Handbook suggests that decreasing the mission time less than 24 hours for structures, systems, and components (SSCs) is more important for SSCs "with a high failure to run probability." The interpretation of this statement can be subjective and applied

inconsistently. Additional guidance should be included to define the statement in relative and quantitative terms.

[Section 4.9, pg. 31 – The phrase "stable plant conditions" is used in several places within the document. It is suggested that a definition be provided or that the term "safe stable state" from the ASME/ANS PRA Standard be adopted to ensure consistent interpretation of what constitutes "stable plant conditions" by various analysts.

[Section 5.1, pg. 33] – The list of activities that are out of the scope of the Handbook include "Crediting defenses against CCF in risk-informed decision-making." This seems to be in conflict with Ground Rule 3 in Section 5.2. This needs to be clarified.

[Section 5.2, pg. 34] - Three ground rules are provided to assist the analyst in treating common cause failure (CCF) in an ECA. Ground Rule 1 indicates that "The PD [performance deficiency] … is assumed to manifest a shared cause of potential failure of other "like" components in a system." The term "like components in a system" is not clearly defined in this context. Such a statement can be misinterpreted and extended beyond the common cause component group (CCCG). Additional clarification should be included to explain what is meant by this term.

[Section 5.2, pg. 34] – Ground Rule 2 gives no credit to successful operability test of redundant components within the CCCG in which a failure was observed. Certain limiting conditions of operation (LCOs) in the Technical Specifications require the performance of additional tests when one component within the CCCG is observed to be degraded or failed. It appears that this rule is in conflict with certain LCOs and some credit should be given for observed successful performance of other components in the CCCG.

[Section 5.3, pg. 35] – Under "Evaluate the PD," it is stated that "If a PD has yet to be defined in a MD 8.3 assessment, then assume that a PD exists." As worded, this could be interpreted as applying to all ECAs, not just those performed for MD 8.3. It is suggested that the statement be revised to state "For MD 8.3 assessments, the existence of a PD should be assumed, even if a specific PD has not been defined."

[Section 5.3, pg. 35] – Under "Choosing a CCF treatment category," it is stated that "SAPHIRE will apply the appropriate conditional CCF probability based on the CCCG size." An example of how this is performed would be helpful to readers who have limited experience with the SAPHIRE code.

[Section 5.4, pg. 37] – The statement is made that "The non-recovery probability for EDG A will be based on the observed failure mechanism and piece-part failure (consistent with the failure memory approach)." The "failure memory approach" was not discussed or referenced in this revision of the RASP Handbook. A discussion of this approach would provide a better understanding of how it is applied in ECAs.

[Table 5-1, pg. 40] – For Category 5, an "Adjusted Baseline" CCF probability is suggested. However, the expression for the adjusted baseline value is not defined in a manner that is similar

to Category 4. The appropriate definition should be included to prevent inappropriate adjustment of the CCF probability.

[Table 5-1, pg. 42] – For Option 2 of Category 6b, reference is made to two options in Case 5a. There is no Case 5a, only Case 5. Further, no options were identified for Case 5. This should be corrected.

[Section 7.2, pg. 62] – In the modeling consideration of "events affecting multiple plants at a site," the guidance indicate that the results of the risk analysis for each plant should not be added together. However, no guidance was provided on how to treat the risk result for the plants. It would be helpful to provide clarification on the treatment of the risk that affects multiple plants.

[Section 7.2, pg. 63] – In the modeling considerations of "Site-wide LOOP event," careful review of CCCG and probabilities is suggested. Typically, CCCGs are not defined across multiple units at a site. It would be helpful to provide added clarification that discusses the purpose of the review and include appropriate examples to address this modeling concern.

[Section 9.4, pg. 80] – The guidance indicates that some level of dependence between human failure events (HFEs) will always be assumed even if specific reasons for the dependence cannot be identified, rather than using a minimum human error probability of 1.0E-06. No guidance is provided to determine the assumed level of dependence, which can be a source of uncertainty. Additional guidance should be included to assess the importance (i.e., perform sensitivity analysis) of the assumed dependency.

Editorial Comments

The suggested text to add is highlighted in red and the suggested text to remove is indicated by ~~strikethrough~~.

1. Throughout the Handbook, "e.g.," and "i.e.," are used. For consistency, either format should be used but not both.
2. Pg. 5, why is the acronym "ac" not capitalized, while the acronym "Dc" is? These should be consistent.
3. Pg. 9, First paragraph of the ***Volume 3, SPAR Model Review*** bullet – Change "… Engineers (ASME)" to "… Engineers (ASME)/American Nuclear Society (ANS) RA Sa-2009 …"
4. Pg. 9, First paragraph of the ***Volume 3, SPAR Model Review*** bullet – Change "Risk-informed Activities]" to "Risk-informed Activities"]."
5. Pg. 9, the first reference should read "PRA Standard (ASME/ANS RA-Sa-2009) and Regulatory Guide 1.200~~)~~"
6. Pg. 16, Example A, Example B, footnote 5, the numerals 6 and 9 should be written out as "six" and "nine" (multiple occurrences).
7. Pg. 25/26, ***Modeling a support system failure*** – Change "… operator actions are accounted." to "… operator actions are accounted for

8. Pg. 34, Ground Rule 1 – Change "… is assumed to manifest a shared cause …" to "is assumed to manifest itself as a shared cause …"

9. Pg. 38, ***Treatment methods*** – Change "… PD associated the CCCG." to "… PD associated with the CCCG."

10. Pg. 39, ***Category 2 of Table 5-1*** - Change "… basic event" to "… basic events."

11. Pg. 39, ***Category 3 of Table 5-1*** – Change "… the component and its' CCCG …" to "… the component and its CCCG …"

12. Pg. 41, ***Category 6a of Table 5-1*** – Change "… (recommended), …" to "… (recommended or preferred approach), …"

13. Pg. 45, ***Definitions: Recovery and repair*** – Change "… are from NUREG/CR-6823 and the American Society of Mechanical Engineers (ASME) PRA Standard." to "… are from Section 5.3 of NUREG/CR-6823 and Section 1-2 of the ~~American Society of Mechanical Engineers (~~ASME/ANS~~)~~ PRA Standard."

14. Pg. 56, ***Adding a recovery event in a fault tree*** – Change "Refer to NUREG/CR-6823 for guidance in parameter estimations." to "Refer to Section 6.0 of NUREG/CR-6823 for guidance in parameter estimations."

15. Pg. 61, **Section 7.1** – the third paragraph has an incorrect font size change.

16. Pg. 75, ***Key Aspects of the SPAR-H Method*** – Change "A brief summary of the key steps of using SPAR-H are provided below." to "A brief summary of the key steps of using SPAR-H ~~are~~ is provided below."

17. Pg. 79, Accounting for dependence – Change "… lower bound value due dependencies that are …" to "lower bound value due to dependencies that are …"

18. Reference, the PRA Standard reference (first reference) should be modified to "American Society of Mechanical Engineers/American Nuclear Society, " Standard for …Plant Applications," ASME/ANS RA-2009, 2009."