HLWYM HEmails

From: Albert Wong
Sent: Thursday, June 08, 2006 2:36 PM
To: Michael Waters
Cc: Amitava Ghosh; Biswajit Dasgupta; George Adams; Andy Campbell; Robert Johnson (NMSS); Christopher Ryder; Rosemary Reeves; fferrante@swri.org
Subject: Re: Draft Appendix C HVAC Example_rev1 FYI

Mike - Good comments, thank you for your suggestions. Specific answers are annotated in blue. Albert

>>> Michael Waters 06/08/2006 12:21 PM >>>
I think the example is in pretty good shape, and good format to be used for others. I do have some suggested wordsmiths I can discuss later. Below are a few comments. Some apply to HVAC example specifically, others may apply to all examples:

1. As Many Questions - I would list the "additional information" in terms of a list of potential information, rather than in the form of questions. I'm also concerned about "the reviewer should ask as many pertinent questions as possible to further his/her understanding of the system" I know what this means as a reviewer, but it could be interpreted by others as a gateway to ask endless RAIs, with minimal benefit in demonstrating safety. We should try to be more specific when possible. Good point, I will fix the language to avoid the impression that NRC is asking endless RAIs.

2. Empirical Analyses - We suggest in this example (and ISG) that empirical analyses (without modeling) may be good enough in some cases. Is there an example (hypothetical or otherwise) where there is system level reliability data for a common HVAC system configuration(s) used in industry? I have not come across such system level estimates. In which DOE could solely rely upon if they had nearly the same analogue system configuration?? My guess is no at this time. Like I said, I have not seen it done anywhere else. FYI, I asked almost the same question to two individuals recently: (1) Harold Walker of NRR/DSS/Containment & Ventilation Branch (used to DSSA before the reorg), and (2) Roger Zavadoski of DFNSB. Harold is NRR's guru when it comes to ventilation. Roger is the Board's expert in nuclear air cleaning. He also sits on the AG-1 committee. Summarily, what they told me was there were enough differences between systems (e.g., BWR vs. PWR) and sites (SRS Canyons vs. Hanford Tank Farms) such that generating an a priori generic reliability estimate across different systems would be difficult, if not impossible. Or are we saying that DOE really needs to model HVAC because of unique configurations? DOE does not necessarily have to model the system if they only need to get a crude estimate or if the HVAC is not ITS. Based on what I have seen at different places, I could probably come up with some rough estimate w/o elaborate modeling. However, if more precision is needed, then modeling is probably the preferred way to go.

Note: My experiential base is mainly from NRR and DOE sites. If anyone knows generic reliability estimates from other sources (e.g., international experience), please feel free to speak up and we can definitely incorporate that piece of evidence into the example.

3. Mean Values - I really like the example discussion of 95th% failure values versus mean values, under the context of uncertainty. Which value is acceptable in the PCSA in terms of Event Categorization? Personally, I would accept the reliability number based on the means because it's routinely done else where. In another word, I would not insist on using the 95th percentile values throught the entire calculations because I will be really surprised if DOE does not have other programs (e.g., QA, maintenance/surveillance, etc.) to prevent their HVAC from degrading into a state such that they have to use 95th percentile numbers throughout the entire system.

The fundamental question is, what does staff do if the mean reliability value versus the 95th% reliability value means makes a difference in the event sequence Categorization (i.e Category 1 vs. Category 2)? This needs to be related back to the guidance on uncertainty in the ISG body. From our earlier conversation, I will try to incorporate language from the ISG itself to cover the uncertainty.

4. Codes and Standards - This is the same question I raised in my last email: We state that Codes and Standards do not guarantee zero failure. But the ISG implies that Codes and Standards may be good enough, alone, to ensure a reliability high enough for some SSCs failures to be screened out of the event sequence (i.e. <10-6). Is this still feasible for HVAC or any other SSC example?? Compiling with codes and standards is a good start. However, codes and standards do not address every aspect of the operations. For instance, we all know active eng. systems need maintenance/inspection to keep them functioning year after year. ASME AG-1 does not specify the inspection frequency of the ventilation system. It's up to the owner to determine the frequency. So following codes and standards is good, but it's not the whole story. I will fix the language so that people will not get the impression that codes and standards alone will get you the reliability.

>>> Albert Wong 06/08/06 10:37 AM >>>
Mike - Following our discussion yesterday, I revised the HVAC example to parallel the flow of the ISG itself. I also asked Center to use the same format in their examples. Please let me know if the example is getting closer to what you expect. I'm working on the canister example now. Thanks

Albert

George - Per your suggestion, I will cut and paste the HVAC write-up from the PSAM 8 paper if I have time. So far I have not receive the paper (in WP or Word format) yet.

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