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August 18, 2000

Ms. Mary Drouin
Mr. Alan Kuritzky
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Mary and Alan,

This letter is a follow-up letter to my June 20, 2000 letter to you and contains additional thoughts. As before, these thoughts are just my own. I do plan to forward them to some industry people with the hope that this will accelerate progress on Option 3.

I believe that there is a way to overcome many of the backfit questions I raised in my earlier letter with a different formulation of your Figure 3-1. Ironically, this suggested new formulation is an order of magnitude more conservative than what was suggested in Figure 3-1.

You may recall my late April presentation wherein I suggested a LERF value of 10^{-6}/RY. This is a factor of ten smaller than the 10^{-5}/RY LERF value in the Prevention-Mitigation scheme in your Figure 3-1. I also suggested that two other, defense- in depth, limits be imposed. They are that mean values of the CDF would not exceed 10^{-4}/RY (for at-power internal events conditions) and that the conditional early containment failure probability, given a core damage event, would not exceed 0.10. The product of these two limits themselves would yield a LERF value of 10^{-5}/RY and another factor of ten reduction would be necessary to meet my suggested overall value of 10^{-6}/RY.

I then examined the present fleet of plants and started with two types which I believe represent the outer edges of present designs, namely BWRs with Mark-I containments and PWRs with large, dry containments. The Mark-I BWRs often have CDF values around 10^{-5}/RY or less. With a conditional early containment failure probability of 0.10, or smaller, they would meet both defense-in depth limits as well as the overall LERF criterion of 10^{-6}/RY. Some PWRs have CDF values closer to 10^{-4}/RY, and those with large dry containments likely have conditional early containment failure probabilities near 10^{-2}. Thus the large, dry PWRs would also meet both defense-in depth limits and the overall LERF limit. Other designs, such as Mark II and III plants, subatmospheric plants, ice condensers would likely fall between the Mark I and large, dry designs and would likely also meet both defense-in - depth limits and the more conservative 10^{-6}/RY LERF limit.

Several benefits can be derived by this alternative formulation. Even if a plant doesn't quite meet this lower LERF value, it may still be possible to achieve it through improved procedures. By using the inherent design capabilities of the present fleet of plants, lower LERF values could be achieved without raising backfit challenges that rise out of the Initiator-Defense-Assessment scheme in Figure 3-1.

Another benefit of this suggestion is that it produces even more margin on meeting the early fatality safety goal. It also somewhat reduces latent fatality risks in that the contribution to the latent fatality risk that occurs during plume passage is reduced by a factor of ten.

All previous arguments about the already small early fatality risk still apply, e.g., smaller source terms, plume rise, atmospheric diffusion and dispersion, graded responses, and human dose response characteristics. This ten fold increase in the already large margin in the calculated early fatality risk opens the door for another thought: All plants whose IPE's have been certified, such as through the certification process now in place in the BWROG or equivalent, and which also meet this stricter LERF goal and the associated two defense -in depth limits, qualify to have the SSC's modeled or accounted for in their IPE's placed into a **risk-based** decision-making regulatory process. As detailed in my June 20th letter to you such SSC's (and associated operator actions) would not need deterministic input for any regulatory process, such as maintenance, inspection, tech. specs.,licensing amendments. These SSC's would have "crossed over" to the risk-based regime by virtue of the strict LERF and defense-in- depth limits and by the quality review process afforded by certification. Any SSC not modeled or accounted for in the IPE would remain in deterministic space. This thought recognizes that deterministic regulation itself may change as there is progress on the requirements placed on SSC's that are judged to be safety significant by traditional means. It also recognizes that deterministic licensing is the default form of regulation and it is up to the "PRA Community" to prove the case that an SSC should be exclusively controlled by risk-based processes. Thus the overall regulatory process would be a blend on a risk-based regime and a deterministic regime, but done in a more efficient **macroscopic** way.

Lastly, let me remind you of an area that I believe needs further discussion and resolution. The following elaborates my use of the words "or accounted for" in the above paragraph. In April I gave the example of the plant heating system whose failure during cold weather might cause a safety system or component to become inoperable. I posed the question: Should this heating system be modeled in the IPE or is it already accounted for in the plant's performance data on the availabilities and reliabilities of the SSC's the plant heating system supports? I believe that some of the staff members would want to have this system modeled and perhaps this is appropriate. Yet, where does one draw the line? The benefits of using risk analyses might be compromised if too many plant features have to be modeled. One does not necessarily model subcomponents or pieceparts of safety significant SSC's even though their failure might cause the failure of the SSC they are part of, yet one usually models support systems such as HVAC and instrument air systems. To me this is a fundamental scope issue and perhaps will be resolved in the development of Option 2.

I hope that you find these additional thoughts helpful.

Sincerely,

Herschel

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