Our input is below. We intend to focus on loss of habitability, and understand if we need to defer loss of control (item 3c) to a later call or meeting.

1. One of the NRC questions was - what was the objective of the FAQ? This FAQ originated from the NRC's list of issues that they were seeing in the FPRA portion of the NFPA 805 LARs. It would be useful to know what the NRC's objectives are for this FAQ.

   NRC's objective for this FAQ is to support its review of the evaluation of the ASD transfer and execution of the plant shutdown upon MCR evacuation. It has become clear to NRC that this issue needs to be further addressed to ensure the success of its NFPA 805 review, and of industry's response, to move forward efficiently in the NFPA 805 review process. A quick response is needed in this issue due to NFPA 805. This resolution is not limited to NFPA 805, but the immediate need is to support NFPA 805 reviews.

2. Please take a look at the track changes in the FAQ to see if the response to the Capability Category comment is sufficient.

   NRC's view is that the resolution to this FAQ does not need to address the PRA Standard and its components. An approved FAQ resolution is acceptable to NRC for use in risk informed applications. All 16 previously solved fire PRA FAQs have had no discussion of the Standard, yet have posed no problems to NRC in its review of NFPA 805 LARs. All discussion of the Standard and associated Regulatory Guides should be taken out of this fire PRA FAQ resolution, as NRC indicated at its last public meeting with industry on this FAQ.

3. We discussed during the last call that the detailed HRA portion of the FAQ could be broken into 3 categories of HRA considerations, and each of these had varying degrees of difficulty/discussion needed. Please take a look at the FAQ and see if you agree with the following categorization, and please identify NRC concerns and considerations within each group (with the suggested primary focus on loss of habitability).

   a. Scenarios where MCR Abandonment credit is not feasible – based on NRC comments there seemed to be no comments on this group. I suggest skipping this group and focusing on the loss of habitability unless there are comments that were not expressed.

   b. Loss of Habitability – Since the decision to abandon is "given" for this group (agreed to in 6850, 1921 and the FAQ) then this should be the group to focus the discussion on first (due to difficulties associated with the decision to abandon). Within this group, there are 2 sub-groups as follows.

   NRC agrees that the decision to abandon is much simpler upon LOH considerations than for LOC. NRC will be making decisions on LAR submittals very soon, and requires a set of criteria to make that decision very soon to meet its schedules. To meet that need in this process, NRC proposes a simplified approach for remote shutdown operations. For LOH, it proposes that NRC and industry discuss those remote shutdown operations that would lead to, at most, a 0.1 failure probability. NRC needs examples of abandonment scenarios with the identification of actions needed, including those away from the ASD panel to accomplish this shutdown. These examples should distinguish between different ASD panel capabilities, so that it can work in this collaborative process to identify what characteristics of remote

shutdown operations meet the 0.1 failure probability. 0.1 would be the lowest failure probability associated with remote shutdown operations in this approach. By identifying those types of remote shutdown operations that would meet these criteria, other sets of operations can be compared to these criteria and assigned a 0.1 as appropriate. In this vein, it invites those fire protection engineers knowledgeable of these operations to participate fully in this activity. NUREG-1921 supports failure probabilities greater than 0.1 and as such could be used for more complicated remote shutdown conditions.

i. Scenarios where no SSCs are affected and no spurious component operation (the "simplest" MCR Abandonment case). Since the cognitive decision to abandon is given, the primary HRA concern is the number of critical tasks (execution actions) and the amount of coordination/control needed for these actions. Traditional HRA methods deal well with the modeling of critical tasks (execution actions). The issues of Complexity, Communication and Coordination are captured via timing impacts, stress and the number of critical tasks. For example, additional coordination/control issues come through in the quantification using existing HRA methods in that the manipulation times are longer (e.g. if tasks are accomplished in sequence vice parallel, or if limited by staff such that it takes longer to complete all tasks, or if there needs to be a hold point for coordination/briefings) and/or the number of critical tasks is larger (e.g. if establishing a series of local shutdown panels vice 1 RSP). From a feasibility standpoint, these tasks are the proceduralized, trained, and timed via JPMs (typically). These types of examples can be added to ensure the issues are addressed appropriately. Agreed? Comments?

ii. Scenarios where SSCs are affected and/or spurious component operation occurs. For example, fire in the MCR panel with the electrical plant controls causes LOSP and SBO, or fire in the panel with the primary relief valves causes a spurious RV opening. This group of scenarios is more complicated than group "3bi" above since it starts with the same "base case" set of required operator actions but then adds additional demands for actions such looking for additional electrical power sources or isolation of a primary relief valve that spuriously opened. Even though this group is more complicated, the FAQ and associated HRA process is similar to "3bi" above. The additional actions to respond to fire-induced SSC failure or spurious component operation become additional critical tasks, and addressing these tasks must be integrated into the response with the other actions in the "base case". For example, the isolation of the spuriously opened primary Relief Valve must be accomplished by a certain point in time and this action may then mean that other actions are accomplished later. Thus, the issues of Complexity, Communication and Coordination are still captured via timing impacts, stress and the number of critical tasks. Agreed? Comments?

c. Loss of Control - Since the modeling of these scenarios is more controversial, I suggest focusing on the loss of habitability first. Once we are in agreement on the loss of habitability, here are key issues to address in addition to those identified for loss of habitability.

For LOC, the simplified process would put forth a probability of 1.0 for failure to perform remote shutdown operations. Credit for a lower failure probability would require a detailed HRA for transfer and execution, as timing and other aspects of the analysis would be more complicated than for LOH

i. Cognitive Failures related to Loss of Control. Cognition consists of Detection, Diagnosis and Decision-Making. The affected fire areas are usually well equipped with detectors/alarms such that the Detection and Diagnosis portion is straightforward and relatively easy. In general, the decision to abandon is an open issue needing additional research (per NUREG-1921). That being said, the current 6850 fire modeling constraints lead to lots of damage in a short time frame (e.g. within 5 minutes) such that the operators have clear indication of the fire's impact and the decision-making becomes simplified. Since the fire is all-encompassing there is typically only one fire scenario. Qualitatively, one needs to talk to the operators and document their training/understanding/expected practice for the response to the scenarios in the fire areas involving loss of control in order to assure feasibility (including procedures, training, timing, cues, staffing, etc.). Quantitatively the existing HRA methods were not developed to address decision-making failures given successful detection and diagnosis. We have looked at examples of the quantification and it is often a lower than expected HEP. Thus the FAQ team decided to add a "floor" for this HEP. This was not meant to be a "bounding value" or conservative value but instead was meant to be lower bound based on expert judgment to address uncertainty in existing HRA methods. Do you agree with inclusion of a lower bound? If so, what suggestions do you have for the lower bound value? Due to the HRA method limitations, the plant-specific differences are primarily qualitative. For these scenarios, the more prominent quantitative differences occur in the execution response (similar to "3bii" above as further expanded in "3cii" below).

ii. Scenarios where (potentially) many SSCs are affected and many spurious component operations occur. The word "potentially" is added because in some older plants this may be the cable spreading room (or similar such as a control room cable vault) that is the common collection point for cables for all plant controls and instrumentation. It is not uncommon for the routing of these cables to be unknown such that the Fire PRA quantifies failures of essentially all SSCs and instrumentation while dealing with several spuriously-induced events. Even though this group is even more complicated and demanding than "3bii" scenarios above, the FAQ and associated HRA process is similar since most plant abandonment procedures were written for this case (and thus the feasibility analysis has been completed). For the reliability quantification (HEP), the additional actions to respond to fire-induced SSC failures and spurious component operation become additional critical tasks, and addressing these tasks must be integrated into the response with the other actions in the "base case" (same approach as in "3bii"). For example, the isolation of the spuriously opened primary Relief Valve must be accomplished by a certain point in time and the diesels may need to be locally started, and these actions may then

mean that other actions are accomplished later. Thus, the issues of Complexity, Communication and Coordination are still captured via timing impacts, stress and the number of critical tasks. The point where the demands from these scenarios becomes more than the crew can handle will result in actions not being feasible. Agreed? Comments?