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Mike\Tom,

Here are four issues\comments that we should discuss at the workshop. If you would like to have formal presentations that enables you to discuss these topics, please send them to us as soon as possible. We will be working to send most (if not all of them) by noon tomorrow. We do not expect to have more than ten issues.

I will discuss with Alex and propose a detailed agenda to cover these and the remaining few issues that we should discuss at the workshop by COB Monday.

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Issue #1: Justification for the use of 0.1 as a screening value.

- With respect to the attributes outlined in the NEI White Paper (time margin, environment, command & control and equipment availability) staff considers these four FLEX elements to have appropriately captured the major considerations for successful FLEX strategy implementation. However, the overall success of any FLEX strategy is highly dependent upon each of these attributes. As a result, the modeling of them as independent failure probabilities is inappropriate. More importantly, their dependencies would infer, Enclosure 1 by NUREG 1792, Sections 4.4.3.5 and 4.4.5.6 standards, a higher overall probability of failure than 0.1 (between 0.1 and 0.5 for high dependence).
- Until there is additional data/methods become available, A FLEX strategy failure probability of 0.1 appears to be an appropriate maximum value, assuming all the attributes contributing to successful strategy implementation are satisfied.
- The NEI white paper justifies the use of 0.1 as consistent with a screening HEP from NUREG-1792, "Good Practices for Implementing Human Reliability Analysis." This is not an appropriate comparison. The screening HEP would be appropriate for post-initiator, control room actions, in emergency operating procedures (EOPs) that are routinely trained on. The NUREG screening value is not appropriate to represent the human reliability for FLEX actions.
- The NEI white paper does not address all relevant human reliability performance shaping factors. Considering high stress, high complexity, low experience/training and potentially poor ergonomics, a starting HEP of 0.3 to 0.5 is more realistic.

Issue #2: Missing Diagnosis element in quantitative analysis

- The cognitive failure (i.e., failure to understand the condition to decide to implement the FLEX strategy in time) is not discussed in the white papers. $HEP = HEP(\text{cognition}) + HEP(\text{execution})$ is a common practice to calculate an HEP. The quantitative white paper only calculates the HEP(execution). The quantitative white paper references NUREG-1921 in the time margin discussion. But the white paper omits the cognition time in the NUREG-1921's time window

Issue #3: Justification for use 0.01 for N+1 equipment

- Equipment availability is currently governed by a potential 90 day allowed outage time (AOT), with currently undefined compensatory measures. Accordingly, a single train N, can always be assured, but N+1 trains may not always be available. The NEI White Paper suggests 0.01 failure probability for N+1 trains, but this is viewed as overly optimistic, given the current guidance. The white papers do not provide technical justification for the above simplified equipment availability and reliability model. Furthermore, lowering the failure probability by a factor of 10 for N+1 equipment may overlook the CCF. Until reliability data becomes available, lowering the screening value by a factor of two appears to be more appropriate.

Issue #4: Potential negative impacts of load shedding

- The approach described in “Streamline Approach for Crediting FLEX in Risk Informed Decision Making” is flawed in that it assumes that there is only a risk benefit from implementing the FLEX strategies. For example, there may be scenarios where Operators implement FLEX for a LOOP and/or LOHS event where they increase risk to the public by performing deep load shedding of 125VDC buses, which might preclude recovery of offsite or onsite power because of a lack of instrumentation and/or control. We would recommend that the quantification process highlight this issue and ask licensees to evaluate the net change in risk due to both positive changes (due to extra equipment available) and negative changes (due to LOOP/LOHS) strategies that may not be successful under FLEX implementation.