

July 23, 2014

Mr. Michael D. Tschiltz
Director, Risk Assessment
Nuclear Energy Institute
1201 F St., NW, Suite 1100
Washington, D.C. 2004-1218

SUBJECT: SUPPLEMENTAL INTERIM TECHNICAL GUIDANCE ON MAIN CONTROL ROOM ABANDONMENT ANALYSIS

Dear Mr. Tschiltz:

The NRC staff has been working with the industry to establish further guidance beyond NUREG/CR-6850 (EPRI 1011989) and NUREG-1921 (EPRI 1023001) for evaluation of main control room (MCR) abandonment due to loss of control and loss of habitability. In this vein, the industry put forth a Frequently Asked Question (FAQ) which would serve as a framework for this analysis. However, the NRC and industry both realized that substantial enhanced guidance was needed to further the state of art and suspended work on the framework. Therefore, the industry proposed a generic methodology to evaluate abandonment due to loss of habitability. The NRC staff evaluated industry's methodology and concluded that the overall approach needed to be more focused on the characteristics of the remote shutdown strategy. The breadth of the approach was narrowed to those characteristics, which would support a human error probability (HEP) of 0.1. The HEP of 0.1 is a generically referenced screening value in NUREG/CR-6850 and NUREG-1921. The NRC obtained feedback from the industry on several occasions on the approach to evaluate main control room abandonment, including a face-to-face public meeting.

The enclosed supplemental interim guidance provides suitable characteristics of a remote shutdown operation due to loss of habitability, which could meet a HEP of 0.1 for failing to transfer control and implement alternate shutdown actions. The characteristics of the remote shutdown operations are the capabilities provided by the remote shutdown panel(s) and those related shutdown actions at and away from the panel(s). As a part of this effort, the NRC staff has established a baseline set of characteristics which qualify for an HEP of 0.1, and a set of relaxations from those baseline characteristics.

As indicated above, the NRC staff has pursued its approach from a practical and operational perspective in order to more closely focus on the characteristics of the remote shutdown strategy. This evaluation provides for a direct assessment of the features and actions of remote shutdown operations and the associated complications, as well as a confirmation of the integrated strategy and its HEP. The discussion below not only supports a more simplified approach to evaluating remote shutdown operations, but is also expected to be part of a detailed HRA. The NRC staff will continue to evaluate submittals on a case by case basis.

This set of relaxations for loss of habitability in the enclosure may not represent all relaxations that could be applied to establish a HEP of 0.1. However, any additional relaxations would need to be justified separately. Licensees may be able to justify more relaxations by analyzing their plant-specific situations and accounting for additional attributes that may offset the risk of those relaxations. Some examples (i.e., not an all-inclusive list, but indicative and/or illustrative) are:

- The limitation on the number of locations might be offset by the use of more operators on shift (e.g., more activities being done in parallel by more people being able to accomplish these tasks in the same timeframe with high reliability), provided all operators have been trained for all potential actions, preferably with applicable job performance measures (JPMs); the actions themselves are straightforward; and the actions do not require more command and control interface/coordination than already allowed in the enclosure.
- Challenging situations for command and control might be compensated for by using a plant-specific remote shutdown panel simulator to frequently train and drill the whole operating crew as a unit, including thorough layout of the command and control structure, communications, and simulated remote actions.
- Command and control challenges might be somewhat offset by physical plant design (e.g., remote shutdown panel is located within a separate, enclosed room that is quiet, with limited access so that the operators at the panel and the SRO in charge can maintain control room access and communications standards similar to that maintained in the MCR).
- A situation where more than one plant parameter needs to be controlled by independent operators separate from the remote shutdown panel might be offset by dedicated communications that are verified to be free of fire damage in all required scenarios and free of any potential interference from fire effects, including other operator activities taken as a result of fire effects (e.g., dedicated headsets for the three locations so that constant communications may be maintained).
- Two or more time-sequenced actions might be justified if the training/drilling has been performed as a team under evaluation and observation (similar to a fire brigade drill where there is an observer at all locations and the “team” communication and coordination is evaluated on a frequent basis).
- Time margins (i.e., time available divided by time required) less than a factor of two might be justified if: (1) the actions are either memorized or essentially automatic (e.g., manual reactor trip), or (2) the actions are trained on frequently in the field and have well-established JPMs. Such a small multiplicative time margin may not be applicable to actions that require a short period of time to complete.

Loss of control could be an additional cause of MCR abandonment. The analysis due to the time of loss of control is more complex, as the time of abandonment and conditions of the plant at the time of abandonment are difficult to determine. Although the enclosed guidance has been developed for loss of habitability, some characteristics may apply to loss of control as well.

M. Tschiltz

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The staff recognizes that some difficult issues remain beyond the clarification provided in the enclosed document. The NRC agrees with the industry's position that additional research is warranted to evaluate the MCR abandonment in support of fire PRA.

Sincerely,

/RA/

Joseph G. Giitter, Director
Division of Risk Assessment
Office of Nuclear Reactor Regulation
U.S Nuclear Regulatory Commission

Enclosure:
Supplemental Interim Technical
Guidance on Main Control Room
Abandonment Analysis

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