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General Comment

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Attached are comments related to draft revision 11 of NUREG 1021, specifically ES-301 D.5.b paragraph 2 and form ES-301-4 item 9

Attachments

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(All of the following comments/complaints are in regard to draft revision 11 of NUREG 1021 ES-301 D.5.b and form ES-301-4 item 9.)

NUREG 1021 Rev. 11 (draft) section ES-301 D.5.b paragraph 2 sentence 4 states:

"The final product of all required scenarios should not contain more than 50 percent of the events (excluding the major events) from the previous two NRC initial licensing exams."

Form ES-301-4 item 9 states:

"Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered in accordance with Section D.5 of ES-301. Not more than 50% of the events/malfunctions are repeated from the previous two NRC initial licensing operating exams, major events excluded.
No. of Non-Major Events from the last 2 exams: ____/ Total Non-Major Events: ____ = % Repeat____"

General Comment: The value of 50% as a limit applied universally is too arbitrary.

For a small BWR with a history of large licensing classes that require, for example, 7 scenarios per exam, being limited to 50% repeat events is too restrictive and burdensome for the exam writer. Though simulators may list thousands of available malfunctions/overrides, the number of malfunction events that will result in procedurally regimented, verifiable actions and conclude within the time constraints of an exam scenario are somewhat limited. The objective of unpredictability can be achieved by a lesser limitation on repeat events and through varying repeat events with different precursor and successor events. On the other hand, for a facility with historically small classes that require, for example, only 2 scenarios per exam, the 50% repeat limitation (allowing 50% repeat events) may not achieve the desired level of unpredictability. With small student/exam populations, the likelihood of any student predicting a repeat event is higher than that for larger student/exam populations. Also, individual scenarios that only have the minimum number of malfunction events would be more predictable than those where extra malfunctions have been included for attribute margin.

Rev 11 anticipates this is going to pose a problem and presupposes the fallaciousness of a universal 50% limit. Rev 11 section ES-301 D.5.b paragraph 2 states: "If a facility encounters difficulty meeting this requirement (for example, because of large class sizes requiring more scenarios be generated than normal), the facility should coordinate with the NRC chief examiner to meet the intent of this section to the extent possible." However, this opens the door for subjectivity and inconsistency.

Recommendation: Delete the universal 50% repeat limitation. Rev 11 ES-301 D.5.b already states: "To maintain test integrity, every applicant shall be tested on at least one new or significantly modified scenario that he or she has not had the opportunity to rehearse or practice. A significant modification means that at least two events or conditions have been replaced or significantly altered such that operators will not recognize them from the previous two NRC initial licensing operating exams." If that is not deemed adequate, include

a limitation that malfunction events in any single scenario must be 50% different than malfunction events in any single scenario during the previous 2 exams. Reduce the limitation on repeat events based on the exam scenario set population (i.e for an exam with 2 scenarios, limit repeat events to 25%; for 3 scenarios, limit repeat events to 50%; for 4 or more scenarios, limit repeat events to 25%).

Comment specific to reactivity manipulation events:

During the NEI Operator Licensing Workshop held in Tampa, FL on 2/9-2/10/2016, NRC representatives stated the limitation on repeat events only applied to malfunction events. However, the wording in the draft revision clearly states events/malfunctions, which is language inclusive of normal events and reactivity manipulations, and clearly excludes major events, only. With respect to reactivity manipulations, the possible permutations for a BWR are limited (e.g via control rods or Recirc flow, raise or lower). Therefore, to include a reactivity manipulation will almost certainly be repeating an event from the previous 2 exams and will, thus, consume a large portion of any repeats allowed.

Recommendation: The wording in revision 11 should specifically exclude reactivity manipulation events from any repeat limitation.

Comment specific to major events:

Rev 11 section ES-301 D.5.b and form ES-301-4 item 9 both state the event repetition limit is exclusive of major events. However, ES-301 D.5.b goes on to state: "Additionally, any repeated major events from the last two tests should be changed so as to alter the course of action (within the emergency procedures) for the given scenario(s)." This contradicts the exclusion and is actually a requirement to have 100% different major events, since the language states "any" repeated major event. That, in itself, would promote predictability.

Although there are many total legs or paths, there are a limited number of "courses of action" within BWR EOPS for RPV control. For example, a LOCA results in either level being maintained with high pressure systems or emergency depressurization and level restoration with low pressure systems, whether there is an ATWS or not. For an ATWS, either level/power control is required or it is not, and level recovery following emergency depressurization is a little different than non-ATWS. Manual pressure control is sometimes required. And emergency depressurization due to containment parameters might be required, but an ED is and ED is an ED. That about sums up the EOP courses of action available for RPV control. If a LOCA with degraded high pressure systems requiring ED when level reaches TAF was used on the previous exam, the language in rev 11 would require "a different course of action". For BWRs, the only other courses of action would be delaying ED until minimum steam cooling reactor water level is reached (by further degradation of injection systems), or failure of RPV level instrumentation requiring RPV flooding. Steam cooling and recovery is not really an option in the simulator, because the control room operator cannot manipulate a control (verifiable action) to recover a system that is so broken that conditions degraded to steam cooling. Even if steam cooling could be exercised as a different course of action, for a facility with even moderate student/exam populations, the language in rev 11 could conceivably limit "LOCA, blowdown at TAF" scenarios to only one every 3rd exam, or about once per 6 years. For my current plant, 4 of the top 10 risk significant operator actions relate to actions that are tested in "LOCA,

blowdown at TAF" scenarios. This proposed change in rev 11 will make all major events equal, regardless of how minor it may be or how improbable it may be.

Recommendation: Delete "Additionally, any repeated major events from the last two tests should be changed so as to alter the course of action (within the emergency procedures) for the given scenario(s)." Instead, add that if a major event is repeated, the exam writer should vary initial conditions and subsequent malfunctions in order to require some operator response that is different than that required in the previous 2 exams.