

Technology Inclusive Risk-Informed Change Evaluation (TIRICE)

Tabletop Exercises – Observations & Actions

August 3, 2022

X-energy Observations & Actions Taken



1. During the tabletops, there was a lot of discussion related to evaluating departures from PRA-related methods of evaluation.
 - a) The level of NRC involvement when making changes to PRA-related methods of evaluation (outside of TIRICE) needs to be addressed.
 - b) Criterion (g) evaluates if the proposed activity results in a departure from a method of evaluation described in the FSAR used in establishing the design bases or in the safety analyses, with the exception of LBE evaluation methods under the change control of the Non-LWR PRA Standard. The team should reconsider the exceptional statement in criterion (g) (related to methods under the change control of the PRA Standard); it may be better to provide clear applicability guidance that PRA-related methods of evaluation are not covered by this process.
 - c) Several examples, including the example related to PRA methods, highlighted the need for a more holistic, risk-informed change control program for activities that could impact the licensing basis. A program is needed to address issues broader than those addressed by 50.59 (state of knowledge, special treatments, etc.).

Removed “with the exception of LBE evaluation methods under the change control of the Non-LWR PRA Standard” from Criterion (i) in the guidance (was Criterion (g) during the X-energy tabletops). Added language related to a follow-on project that will address the broader aspects of LMP safety case management beyond the regulatory process associated with 10 CFR 50.59.

X-energy Observations & Actions Taken



2. The approach to evaluating DID impacts for assessing the need for prior NRC approval of changes needs validation and may require adjustment. It is recognized that DID will also be addressed in the broader program (see item 1.c above). **Additional guidance was developed for the DID assessment in Criterion (h) and several DID examples were added.**
3. For examples that involved PRA quantifications, conservatively bounding approaches were used, and none challenged the criteria. It should be noted that no examples impacted consequences on the F-C curve, only frequency. **Developed an example to be evaluated in the Sodium tabletop that shifted consequences closer to the limit. Examples were provided in the guidance document that impacted the relationship to the F-C curve.**
4. Several examples highlighted the need for careful consideration on how guidance from NEI 96-07 translates into TIRICE and how it should be applied (e.g., apply guidance to DBAs but maybe not other LBEs). The example related to the use of manual action in lieu of automatic action highlighted this point. **Guidance incorporates information from NEI 96-07, Revision 1 related to DBAs, where appropriate. Several examples in the guidance document highlight the differences in applying the criteria to DBAs versus non-DBA LBEs.**
5. While evaluating DID (criterion (f)) the team discussed the potential of offsetting the risk increase of a proposed activity by implementing another activity that reduces the risk. This brought up the concept of interdependence of changes and the existing limitations of NEI 96-07 for bundling unrelated changes into a change evaluation. This needs to be considered in the guidance. **The guidance document includes additional guidance related to interdependence.**

X-energy Observations & Actions Taken



6. Consider whether additional guidance or screening criteria is needed for evaluating changes to reliability targets. The white paper states that a safety-significant SSC that is unable to meet its reliability or capability targets would “screen in” and full evaluation would be required. Determine if existing criteria are sufficient to determine if changes in reliability (caused by a change in plant design) have an adverse impact on accomplishment of a required safety function and should require prior NRC approval.

The guidance provides that if a proposed change results in the need to change an SSC reliability or capability target, then the change would screen in for full evaluation. We determined that the existing criteria are adequate for addressing the potential impact of a change to reliability or capability of an SSC.

Natrium Observations & Actions Taken



1. There were several discussions related to the role of the integrated decision-making process (IDP) for assessing proposed changes to the facility.
 - a) TIRICE team should consider guidance on how the IDP is utilized for a proposed activity that potentially impacts the reliability of a layer of defense-in-depth (DID)(Examples 3 and 5).
 - b) Need to better define the role of and the process to be followed by the IDP for a proposed activity that changes special treatment (Example 2).

Provided additional guidance to describe when it's appropriate to invoke the IDP and included examples in the DID section.

2. The guidance should be enhanced to provide additional detail for interpreting the third and fourth bullets of section 5.9.6 of NEI 18-04, which is related to evaluating criterion (h) for assessing if the activity would have a more than minimal adverse effect on DID adequacy. **This is related to observation 2 from X-energy.**
3. Consider adopting language from NEI 96-07 related to assessing the likelihood of occurrence of a malfunction; specifically, the use of increasing a component's likelihood of failure by a factor of two (Example 3). **Both DBA and non-DBA examples were included in the guidance document related to Criterion (f). The team determined that specifying a factor of two increase would be undesirable because the amount of appropriate variation in a PRA sensitivity study would likely vary case-to-case.**

Sodium Observations & Actions Taken



4. The TIRICE White Paper, Revision D, states that if a proposed activity results in a safety-significant SSC being unable to meet its reliability and capability target, then it would screen in for evaluation. However, reliability targets of SSCs are not directly addressed in the criteria. Need to develop additional guidance for the evaluation of changes to reliability targets (likely under criterion (f)). **This is related to observation 6 from X-energy.**
5. TIRICE team should determine what part of the change process (applicability or screening) will direct the user to the PRA Standard for addressing changes to PRA-related methods of evaluation (Example 1b). **This is an ongoing discussion among the TIRICE team.**
6. The example related to extending the service life of a component highlighted that additional guidance may be warranted to assess if an activity adversely affects a design function of an SSC (Example 4). For example, some changes could have an adverse effect that results in exceeding the conservative assumptions within the safety analyses. **The example that prompted this observation was included in the guidance document in the section that covers screening of changes to the facility.**

Natrium Observations & Actions Taken



7. The TIRICE team should consider if additional guidance is needed for assessing the impact of uncertainty when evaluating the impact a proposed change has on the frequency-consequence (F-C) curve. **No specific information was added to the guidance document as the treatment of uncertainty is fundamental to the use of risk insights and is addressed in NEI 18-04.**
8. The concept of reducing margins by modifying design inputs was explored in Example 6. The TIRICE team should evaluate if additional guidance is needed for situations when margins are reduced, but do not exceed acceptance criteria. **This issue is in the process of being resolved.**
9. A discussion was held regarding a downgrade in safety classification (e.g., NSRST to NST) and whether that type of change would require prior NRC approval. The TIRICE team responded there are no specific criteria on safety classification downgrade, but that it would likely trigger other criteria requiring prior NRC approval. **Consideration is being given to revising Criterion (g) to include changes to safety classification regardless of direction (up or down).**
10. Examples 1a and 1b illustrated how the guidance distinguishes between PRA methods not used for design basis accident (DBA) analyses and PRA methods also used for DBA analyses. The evaluators correctly concluded that prior NRC approval was required for certain changes to methods of evaluation used in DBA analyses. **Two examples from the Natrium tabletop are included that highlight the differences in assessing changes to methods of evaluation used for PRA versus DBAs, and for methods that are used for both.**