

RAI 1 Integrated Decision Making Panel (Expert Panel) Review of Surveillance Frequencies Based on Codes and Standards

"Provide deterministic criteria in the basis document that would be used to approve revisions to surveillance frequencies that are based upon approved Codes and Standards.

A critical attribute for any calibration or surveillance test is the interval between calibrations or tests. Many of the present surveillances, surveillance test intervals, and acceptance criteria were established over a 40 year history of industry consensus standards and regulatory endorsement through the regulatory guide processes. The guidance in RG 1. 174 states that sufficient safety margins are maintained when codes and standards (e. , American Society of Mechanical Engineers (ASME), Institute of Electrical and Electronic Engineers (IEEE) or alternatives approved for use by the Nuclear Regulatory Commission (NRC) are met.

The current draft of the methodology document recognizes that Codes and Standards help maintain safety margins but does not contain criteria for revising surveillance frequencies. The importance of recognizing requirements based on codes and standards is demonstrated by an example evaluation included with the Limerick pilot plant request (STI#4). The example indicated the Expert Panel determined there were no codes or standards associated with the Limerick emergency diesel generator (EDG) surveillance test frequencies. However the EDG surveillances are directly mentioned in IEEE Std.- 387, "Standard Criteria for Diesel-Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations. " Refer to attached Table 1."

Response

We have reviewed IEEE Standard 387 in this regard. The 1977 version of the IEEE standard addresses many aspects of the diesel generator, including design criteria, features, qualification, load profiles, preventive maintenance practices, etc. A small portion of the standard addresses periodic testing, and only Paragraph 6.6.1 provided a test interval (no longer than 1 month for the availability test). The 1987 version of the standard added an 18 month interval to Paragraph 6.5.2 for the operational tests. The 1995 version of the standard incorporated the testing requirements from IEEE standard 749-1983. Table 3 of IEEE 387-1995 – Site Testing, provides surveillance frequencies for a number of tests.

We have reviewed the standard, and determined that no technical or other basis is provided for the test frequencies listed. Discussions with personnel involved in the development of the standard indicated that the frequencies were provided in part to be consistent with manufacturer recommendations, scheduling practices, NRC expectations and Technical Specifications.

The standard notes the following:

“Use of an IEEE Standard is wholly voluntary. The existence of an IEEE Standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE Standard. Furthermore, the viewpoint expressed at the time a standard is approved and issued is subject to change brought about through developments in the state of the art and comments received from users of the standard.”

We believe that the risk informed methods used to establish surveillance intervals under NEI-04-10 will provide an appropriate technical basis for the intervals, and represent a “development in the state of the art” as discussed above. The risk methods proposed are consistent with NRC policy and regulatory practice, meet PRA technical adequacy requirements (Limerick is a pilot for Regulatory Guide 1.200), address all aspects of the integrated decision process of Regulatory Guide 1.174, and will in fact provide a much more robust technical basis for the surveillance interval than that which currently exists. We believe subsequent modifications to the IEEE Standard should address these methods, as they will provide a rigorous basis for test intervals that is not reflected in the existing standard. We note that all the standards development organizations, including ANS, ASME, and IEEE, are incorporating risk-informed methods.

The NRC notes that Regulatory Guide 1.174 references the use of codes and standards to establish and maintain adequate safety margins. We are in agreement with this concept, and note that the compliance will be maintained with the vast majority of IEEE Standard 387 (and other relevant standards), including those elements that are technically relevant to maintenance of safety margin (e.g. design and maintenance practices, test methods, etc). We do not believe Regulatory Guide 1.174 infers that every aspect of codes and standards must always be met to establish sufficient safety margin. We note that several previous NRC approved risk initiatives, including risk-informed inservice inspection and risk-informed inservice testing, have established test intervals that differ from those in codes and standards existent at the time the initiatives were pursued. Further, NRC Generic Letter 91-04, which addressed 24 month refueling cycles, provided for the establishment of intervals that differed from existing codes and standards requirements.

We believe that the “deterministic criteria...that would be used to approve revisions to surveillance frequencies that are based upon approved Codes and Standards” suggested by NRC in the RAI are in fact already contained in the steps of the process. These include a thorough evaluation of vendor recommendations, performance history, maintenance practices, industry codes and standards, all of which are considered by a plant expert panel in conjunction with the risk information. However, in order to provide additional emphasis on this consideration, Step 7 in the methodology will be supplemented as indicated below.

Step 7 of the methodology (NEI-04-10) contains the following bulleted item:

- Consider applicable ASME, IEEE, and other code-specified test intervals.

This item in Step 7 will be changed to the following to provide clarity and direction:

- Test intervals specified in applicable industry codes and standards, e.g., ASME, IEEE, etc.
 - Review both committed and current codes and standards.
 - Align the considerations with the technical bases, if any, provided for test intervals in the codes and standards.

RAI 2 Technical Specification Surveillance Frequencies vs Acceptance Criteria

"Provide deterministic criteria in the basis document to address whether more conservative acceptance criteria will be necessary for an extended surveillance frequency. Specifically, discuss when a surveillance frequency extension would require a change in the acceptance

criteria, such as the as-found and as-left allowable values."

Response

The subject LAR proposes to relocate the surveillance frequencies to licensee control. A change to the acceptance criteria specified in the TS surveillance requirements is not being proposed. Imposition of acceptance criteria that are more restrictive than the TS surveillance requirement acceptance criteria in order to support an extended surveillance frequency would not be permitted unless the more restrictive acceptance criteria are first approved by the NRC by license amendment. However, licensee surveillance procedures may contain acceptance criteria that are not specified in the TS, such as as-left and as-found values. These non-TS values may be revised, as appropriate, to reflect or support a revised surveillance frequency as long as the revised acceptance criteria remains valid when reviewed against the accident analyses.

To capture this idea, Step 7 of the methodology document (NEI 04-10) will be revised to include the following statement:

"Confirm that assumptions in the plant licensing basis would not be invalidated when performing the surveillance at the bounding interval limit for the proposed STI change. For example, if the assumptions in the plant licensing basis would be invalidated at the bounding STI, the STI could be limited accordingly, or, for acceptance criteria not specified in the Technical Specifications, a more conservative acceptance criteria could be established, as appropriate."

RAI 3 Monitoring for Conditioning/Exercising

"Provide deterministic criteria in the basis document that evaluates the degree that a surveillance provides a conditioning exercise to maintain equipment operability, prior to changing the surveillance frequency.

Many surveillances exercise safety-related components and supporting systems on a periodic basis. This periodic exercise of the components provide a measure of conditioning, such as lubrication of bearings and electro-pneumatic relays, or electrical contact wiping (cleaning) of built-up oxidation."

Response

The "deterministic criteria...that evaluates the degree that a surveillance provides a conditioning exercise to maintain equipment operability are in fact already contained in the steps of the process. These include a thorough evaluation of vendor recommendations, performance history, and maintenance practices. However, Step 7 of the methodology document (NEI 04-10) will be supplemented to include the following statement:

"The degree to which the surveillance provides a conditioning exercise to maintain equipment operability, for example, lubrication of bearings or electrical contact wiping (cleaning) of built up oxidation, and limit the STI accordingly."

RAI 4 Controls on the Time of Permitted Surveillance Frequency Extensions

"Provide deterministic criteria in the basis document of a minimum number of surveillance intervals that would be required to establish a database to further extend a previously extended surveillance frequency."

Response

A qualitative review of surveillance test performance ensures that there is no evidence of any repetitive failures associated with the surveillance requirement which would invalidate the general conclusion that the impact on system availability will be small as a result of the proposed change in surveillance frequency.

For a surveillance frequency previously extended through the Surveillance Frequency Control Program, Step 0 of the methodology document (NEI 04-10) will be revised, consistent with the guidance provided in NUMARC 93-01, to include the following statement to ensure that sufficient surveillance data is collected before extending the frequency further:

"For an STI previously extended through the Surveillance Frequency Control Program, the minimum number of surveillance intervals required to establish an adequate database for further extending the STI shall be as follows:

- (1) a minimum of three successive satisfactory performances of the surveillance where the STI is less than or equal to six months,
- (2) a minimum of two successive satisfactory performances of the surveillance where the STI is greater than six months but no greater than two fuel cycles, or
- (2) another defined period of satisfactory performance(s) of the surveillance based on a documented technical justification."

NOTE: The criteria provided above do not apply to the concept of "phased" implementation as described elsewhere in the methodology document. If phased implementation is used, the schedule for the phased implementation is established based on the results of the evaluation and is determined by the Independent Decisionmaking Panel as part of their approval of the proposed STI change.

RAI 5 Monitoring Criteria For Returning to the Original Surveillance Frequency

"Provide deterministic criteria in the basis document that describes how monitoring and feedback of a surveillance with an extended frequency would result in a return to the original frequency when the number of surveillance test failures are determined to be too many."

Response

Unsatisfactory performance of a surveillance can be the result of any number of factors. Each individual surveillance test failure would be captured in the Corrective Action Process and evaluated on a case-by-case basis to determine the cause of the test failure and the extent of the condition. The failures of particular concern within the Surveillance Frequency Control Program would be those where the time interval between performances of a surveillance is

determined to be a factor in the cause of unsatisfactory performance of the surveillance, i.e., time-based failures.

To address this issue, Steps 19 and 20 of the methodology document (NEI 04-10) will be revised to include the following changes:

Step 19:

The SFCP contains provisions whereby component performance data is fed back periodically into the component test strategy determination (i.e., test interval and methods) process. This would include results of component or train level monitoring and results of Maintenance Rule (or §50.69 monitoring). The results of these periodic re-assessments are fed back to the IDP in Step 20 for evaluation.

Measures should also be in place to identify the need for more emergent program updates (e.g., following a major plant modification or following a significant equipment performance problem). In addition, for a previously extended STI, if two consecutive unsatisfactory performances of the surveillance occur, then an assessment shall be performed to determine if the time interval between performances of the surveillance is a factor in the cause of the unsatisfactory performance of the surveillance. The results of these emergent assessments are presented to the IDP in a more timely manner in Step 20 for evaluation.

Step 20:

The IDP is responsible for review of performance monitoring results (from Step 19) and attendant re-assessment of the program.

Step 20 is entered from Step 19 where the operating experience feedback following STI change implementation is periodically reviewed, or the results of an emergent assessment warrant review by the IDP, e.g., if it has been determined that the time interval between successive performances of a surveillance is a factor in the cause of two consecutive unsatisfactory performances of the surveillance. In the case of the example, the IDP shall return the STI back to the previously acceptable STI.

Any changes identified by the IDP are routed to Step 13, or if no adjustments are required, monitoring is continued in accordance with Step 18. Results of periodic reassessment and any changes to an STI resulting from Step 18 (Monitoring and Feedback) and Step 19 (Periodic Re-assessment) are documented in accordance with the SFCP.

References:

1. Letter from M. P. Gallagher, Exelon Generation Company, LLC, to U.S. Nuclear Regulatory Commission, dated June 11, 2004.
2. Letter from T. R. Tjader, U.S. Nuclear Regulatory Commission, to B. Bradley, Nuclear Energy Institute, and M. P. Gallagher, Exelon Generation Company, LLC, dated June 6, 2006.