

Staggered Integrated Engineered Safety Features/Loss of Offsite Power Testing

Background

The nuclear industry and the U.S. Nuclear Regulatory Commission (NRC) have been working together to develop Risk-informed Technical Specifications (RITS) to enhance plant safety and improve plant operations. One of these is the RITS-5 Initiative to relocate surveillance frequencies to licensee control. This initiative requires relocation of the periodic Technical Specification Surveillance Frequencies to a licensee-controlled program – the Surveillance Frequency Control Program (SFCP). After relocation to the SFCP, changes can be made to the surveillance frequencies following Nuclear Energy Institute (NEI) 04-10, Rev. 1, guidance without review and approval of the NRC.

NEI 04-10, Rev. 1, which has been approved by the NRC, provides the guidance for evaluating surveillance frequency changes. The approach is risk-informed and requires an assessment of the impact of the change on plant risk, defense-in-depth and safety margins.

It also requires an assessment of component performance and impact on regulatory requirements, and development of monitoring requirements. All proposed changes need to be reviewed and approved by the plant's Integrated Decision-making Panel (IDP).

The engineered safety features/loss of offsite power (ESF/LOOP) surveillance is a complex integrated test that demonstrates the operability of many components. Because of its complexity, this test can compromise personnel safety, unrelated to nuclear safety. This test requires additional cycling of components, increasing component wearout, and extends the outage length if the test is performed on critical path. With this change, if the test is performed on critical path, an outage reduction of up to 18 hours may be achieved. In addition, the ESF/LOOP test addresses components that are often tested more frequently by other surveillances. Historically, issues identified during this surveillance often are unrelated to the safety functions being tested.

Description

Westinghouse can assist utilities in performing the assessment to justify a staggered test basis for the integrated ESF/LOOP surveillance. On a staggered test basis, the surveillance frequency is changed from testing both trains every 18 months to testing one train every 18 months on an alternating, or staggered, test basis. With this frequency change, each train will now be tested every 36 months.

The approach used will follow that defined in NEI 04-10, Rev. 1, and further defined in WCAP-17667-P for this specific application. This WCAP resulted from the Pressurized Water Reactor Owners Group (PWROG) program for the pilot application of this particular change.

Westinghouse can:

- Lead the evaluation process
- Perform the risk analysis
- Assess the impact on defense-in-depth and safety margins
- Complete the regulatory assessment
- Assess plant operating experience and component conditioning effects of the surveillance
- Develop monitoring requirements
- Support the IDP assessment

Westinghouse has considerable experience with developing risk-informed justifications for changes to plant technical specifications.

Benefits

Reducing the ESF/LOOP surveillance frequency can improve personnel safety and reduce excessive cycling of safety-related components, resulting in less wear and potentially a reduction in outage length. With this change, if the surveillance is performed on critical path, plants can potentially achieve an outage reduction of up to 18 hours.

Experience

Westinghouse successfully completed and implemented a PWROG program to justify a staggered test frequency for the integrated ESF/LOOP at a pilot plant. This change was implemented at the pilot plant during the fall 2012 refueling outage. Westinghouse has completed a number of other test frequency changes following the guidance in NEI 04-10, Rev. 1, and also has successfully completed a number of technical specification surveillance frequency changes on a generic or plant-specific basis, following the traditional approach via a License Amendment Request.