

R^{HYBRID}**C 2023**

U.S. Nuclear Regulatory Commission
35th Annual Regulatory Information Conference



NAVIGATING the NUCLEAR FUTURE

MARCH 14-16, 2023

Bethesda North Marriott Hotel
and Conference Center
Rockville, Maryland



WWW.NRC.GOV

[#NRCRIC2023](https://twitter.com/NRCRIC2023)

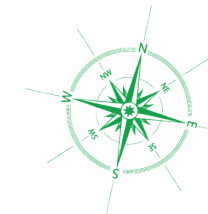


Impacts of Risk-Informed Licensing Actions at Nuclear Power Plants

In 1995, the Commission formalized its commitment to risk-informed regulation through the expanded use of probabilistic risk assessment (PRA) by issuing its “PRA Policy Statement.” The PRA Policy Statement states, in part, that the use of PRA technology should be increased in all regulatory matters to the extent supported by the state of the art in PRA methods and data, and in a manner that complements the NRC's deterministic approach and supports the NRC's traditional defense-in-depth philosophy.

Since issuing the PRA Policy Statement, the NRC has developed and implemented risk-informed initiatives in several areas, allowing licensees to increase the use of PRA technology in regulatory matters:

- Containment Leakage Rate Testing
- Surveillance Frequency Control Program, TSTF-425
- Risk-Informed, Performance-Based Fire Protection Program, 10 CFR 50.48(c) (NFPA 805)
- Risk-Informed Categorization of Structures, Systems, and Components, 10 CFR 50.69
- Risk-Informed Completion Times, TSTF-505





Containment Leakage Rate Testing

Allows the Type A test or integrated leak rate test (ILRT) to be extended permanently to a 15-year interval using a risk-informed process.

The ILRT measures the primary reactor containment overall integrated leakage rate after completion of the containment and at periodic intervals thereafter. It is initially conducted after 48 months of operation, with extension to 10 years after two successful tests.

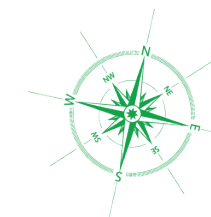
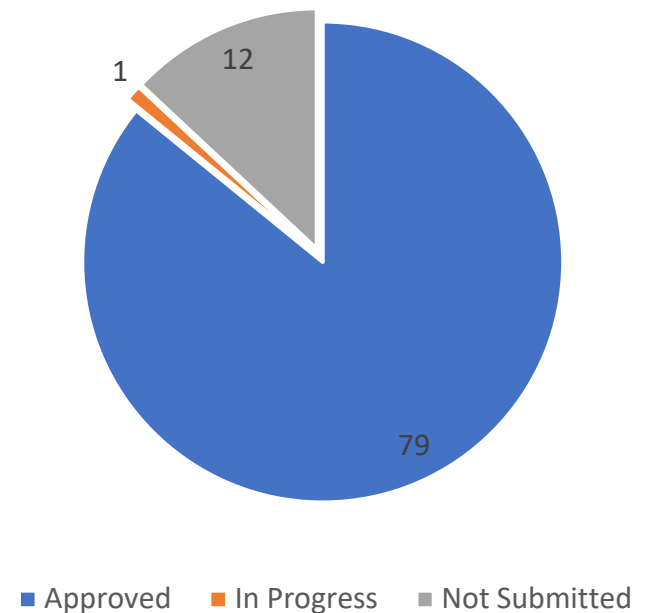
BENEFITS

- **Safety benefit to shutdown risk**
- **Reduced planned outage time**
- **Reduced costs**

STATUS

- First amendment issued in 2014
- 79 unit amendments issued, 86%
- 12 units not yet submitted, 13%
- 1 unit currently under review, 1%

*Number of Nuclear Power Plant Units
 Type A ILRT Frequency
 Extension to 15 Years*



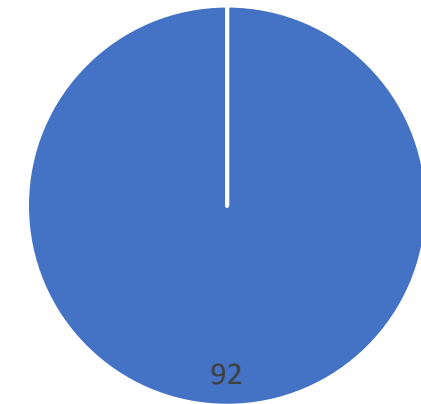


Surveillance Frequency Control Program, TSTF-425

Allows for the relocation of surveillance test intervals of various technical specification (TS) surveillance requirements to a new surveillance frequency control program.

Provides for a risk-informed method to change surveillance frequencies in which PRA methods are used, in combination with plant performance data and other considerations, to identify and justify modifications to the surveillance frequencies of equipment.

*Number of Nuclear Power Plant Units
 Surveillance Frequency Control
 Program, TSTF-425*



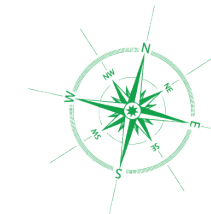
■ Approved

BENEFITS

- **Lower chance of initiating event**
- **Greater equipment availability**
- **Optimal alignment of test intervals**
- Lower burden on licensee

STATUS

- First amendment issued in 2006
- 92 unit amendments issued, 100%
- Last amendment issued in 2022





Risk-Informed, Performance-Based Fire Protection Program, 10 CFR 50.48(c) (NFPA 805)

Allows transition of existing deterministic fire protection program to a risk-informed, performance-based program based on National Fire Protection Association Standard (NFPA) 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition.

Allows the use of performance-based methods, such as fire modeling, in conjunction with risk information to demonstrate compliance with the nuclear safety performance criteria.

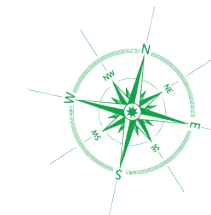
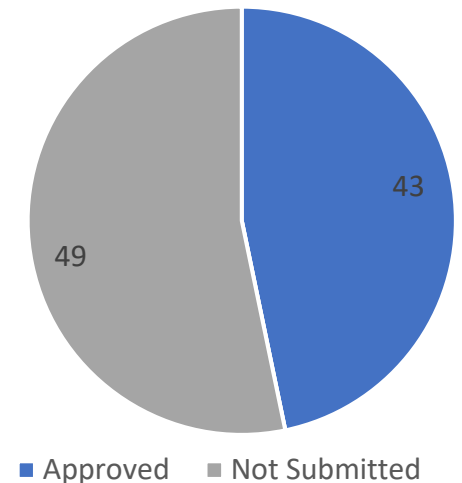
BENEFITS

- Plant changes result in safety improvements
- Reduction in fire risk
- Improvement in fire risk methods
- Eliminates compensatory measures

STATUS

- First amendment issued in 2010
- 43 unit amendments issued, 47%
- 49 units not submitted, 53%
- No units currently under review
- Last amendment issued 2020

Number of Nuclear Power Plant Units Risk-Informed, Performance-Based Fire Protection Program, 10 CFR 50.48(c)



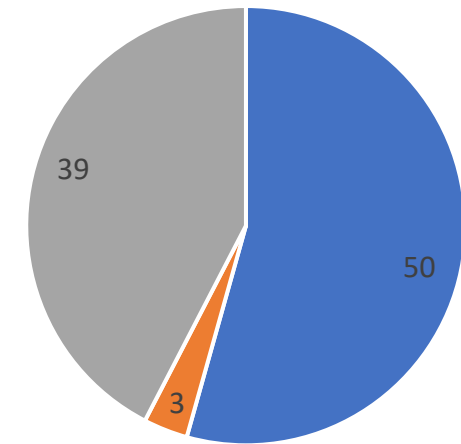


Risk-Informed Categorization of Structures, Systems, and Components, 10 CFR 50.69

Determine safety significance of structures, systems, and components (SSCs) based on an NRC-approved, risk-informed categorization process.

Modify special treatment requirements for safety-related SSCs of low safety significance.

Number of Nuclear Power Plant Units Risk-Informed, Categorization of SSCs, 10 CFR 50.69



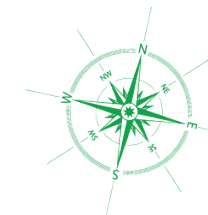
■ Approved ■ In Progress ■ Not Submitted

BENEFITS

- Improved focus on SSCs of high safety significance
- Accelerated completion of deferred maintenance
- Increased operational flexibility
- Reduction in regulatory burden without adversely affecting public safety

STATUS

- First amendment issued in 2018
- 50 unit amendments issued, 54%
- 39 units not submitted, 43%
- 3 units currently under review, 3%
- Most recent amendment issued in 2022





Risk-Informed Completion Times, TSTF-505

Adds new program in TS “Administrative Controls,” entitled the “Risk-Informed Completion Time Program,” that allows TS completion times to be extended using a risk-informed approach.

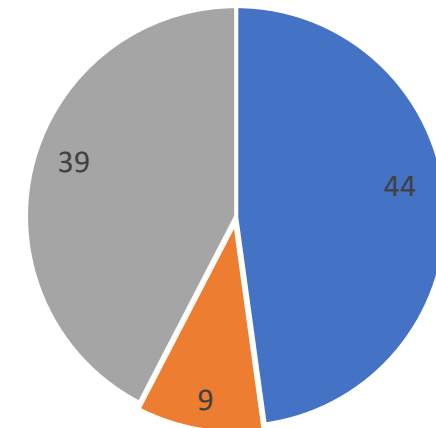
*Number of Nuclear Power Plant Units
 TSTF-505
 Risk-Informed Completion Times*

BENEFITS

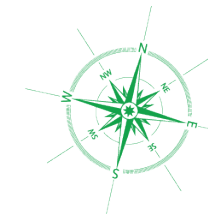
- **Averted shutdowns**
- **Reduced outage complexity**
- Reduction in notices of enforcement discretion
- Reduction in one-time allowed outage time/completion time extension requests

STATUS

- First amendment issued in 2007
- 44 unit amendments issued, 48%
- 39 units not submitted, 42%
- 9 units currently under review, 10%
- Most recent amendment issued in 2022



■ Approved ■ In Progress ■ Not Submitted



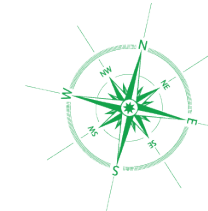


Overall Benefits of Risk-Informed Licensing Actions at Nuclear Power Plants

- Reduced personnel dose
- Plant modifications result in safety improvements
- Reduced plant shutdowns
- Reduced outage duration, complexity, and risk
- Enables work to be completed while plant is online, reducing outage risk
- Completion of deferred maintenance without additional license amendments or exemptions
- Extended surveillance frequencies
- NRC staff become familiar with plant PRAs

Current Status of Risk-Informed Licensing Actions

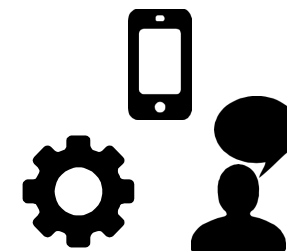
- Over 300 risk-informed unit amendments issued since 2006 for major program initiatives (ILRT, TSTF-425, 10 CFR 50.48, 10 CFR 50.69, and TSTF-505). Major risk-informed program initiatives either complete or 50% or more complete/in progress
- Over 250 risk-informed unit amendments issued since 2001 for other programs, such as risk-informed inservice inspection, technical specification allowed outage time/completion time extensions, other TSTFs, Tornado Missile Risk Evaluator (TMRE), seismic PRA, risk insights, and Risk-Informed Process for Evaluations (RIPE)





Contact Information

Jay Robinson, Acting Chief
PRA Licensing Branch B
Division of Risk Assessment
Office of Nuclear Reactor Regulation
Jay.Robinson@nrc.gov



Information used in this exhibit is current as of January 25, 2023, and does not necessarily represent the views of the NRC.

