

Technical Specifications Surveillance Requirement Frequency Improvements via Risk-Informed Initiative 5b Approach

Luyen Nguyen

Westinghouse Electric Company LLC

Objectives

1. Provide a high-level overview of the TS SR frequency improvement program (Risk-Informed 5b) and its benefits
2. Discuss different risk-evaluation approaches used to justify surveillance test frequency changes

1. Overview of TS SR frequency improvement program – Risk-Informed TS Task Force (RITSTF) Initiative-5b

RI Tech Spec Initiative-5b Overview

- Uses Probabilistic Risk Assessment (PRA) risk information along with deterministic requirements to modify TS surveillance frequency (also known as Surveillance Test Intervals (STIs) extension)
- Industry governing guidance:
 - NEI 04-10, Rev. 1, Risk-Informed Method for control of Surveillance Frequencies
 - Regulatory Guide (RG) 1.174, Rev. 2, Approach for using PRA in RI Decisions on plant-specific changes to the licensing basis
 - RG 1.177, Rev. 1, Approach for Plant-Specific RI Decisionmaking: Technical Specifications
- In compliance with NEI Efficiency Bulletin 11-17

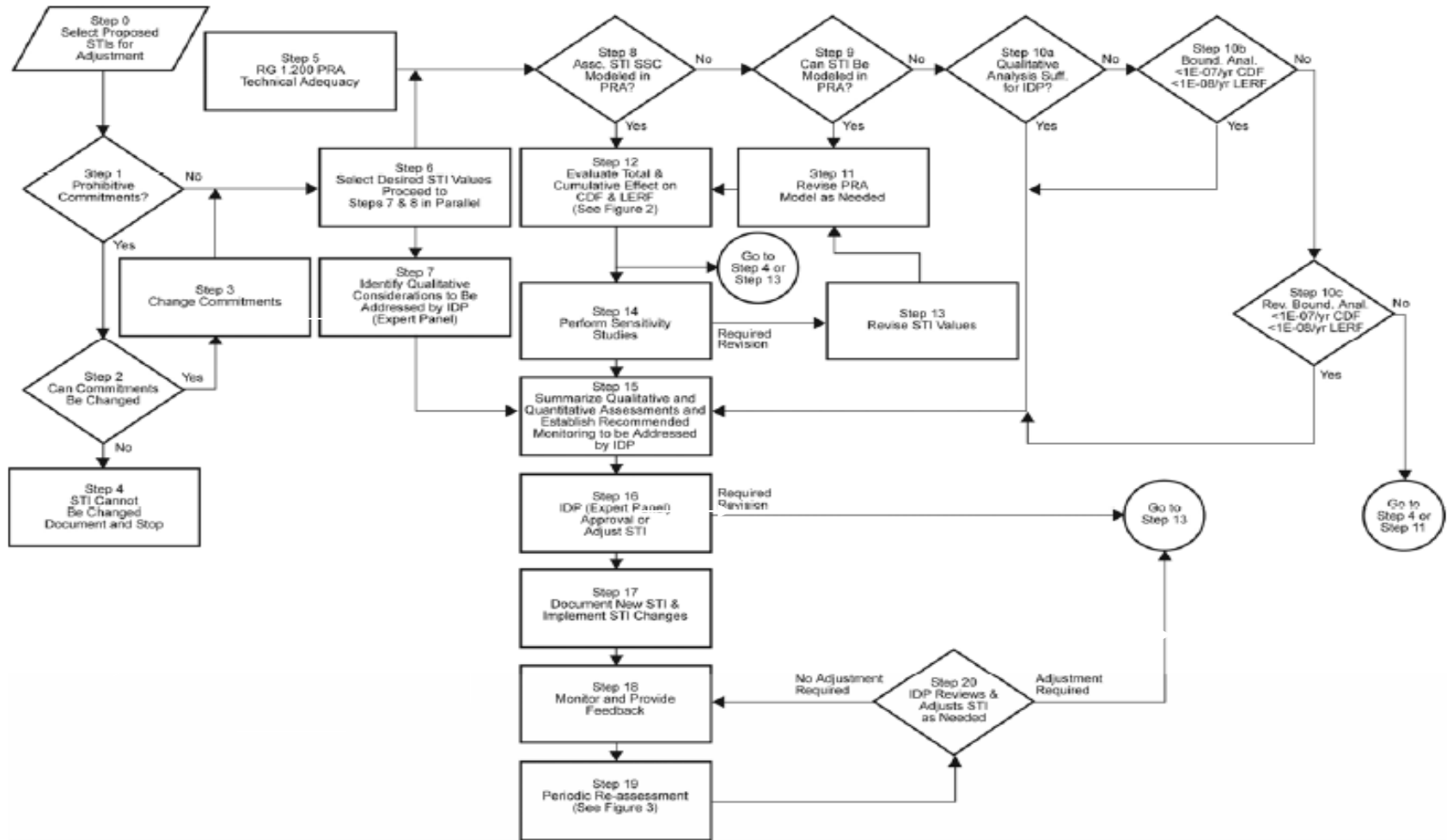
RI Tech Spec Initiative-5b Overview (cont.)

Program Benefits:

- Reduce component testing → cost reduction
- Reduce component unavailability (reduce component time out of service required for testing)
- Reduce outage time for SR completed during refuel outage
- Reduce worker exposures

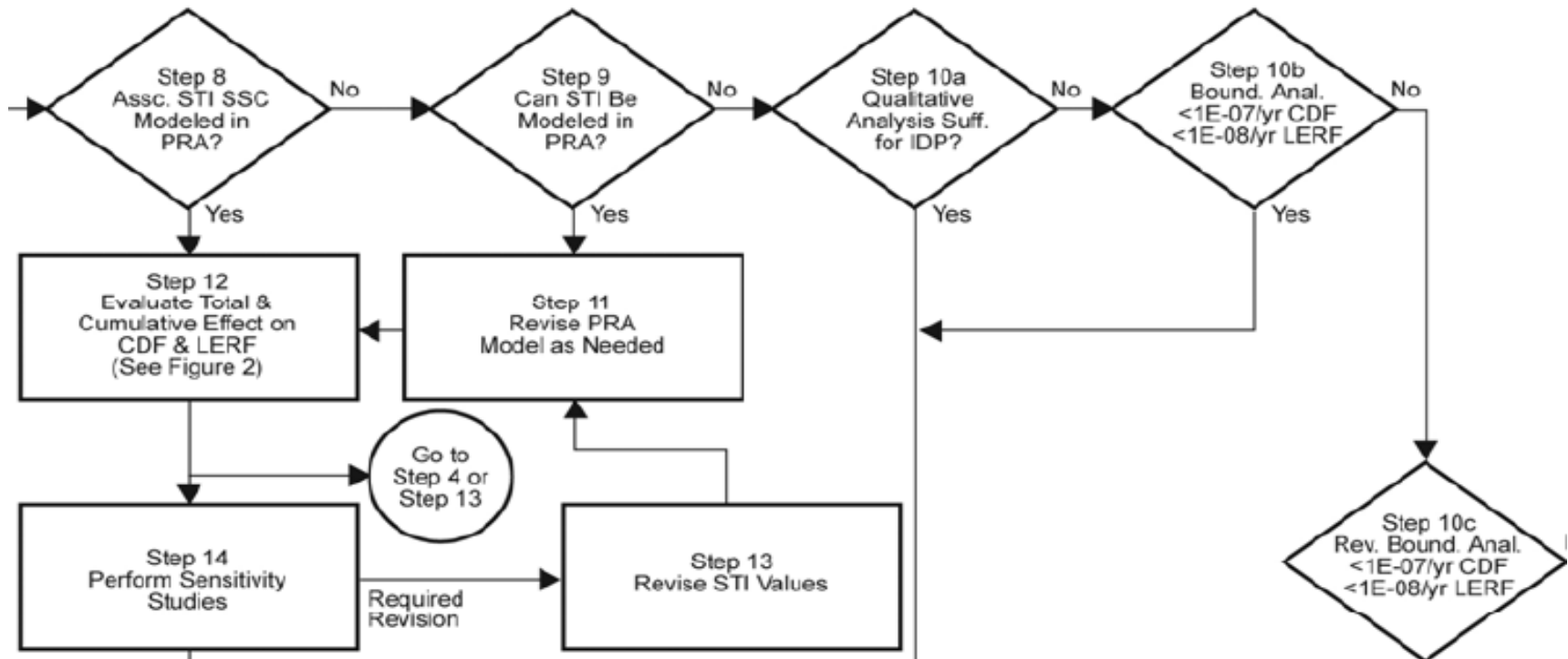
Benefits are directly related to STI being addressed.

SR Frequency Change Program Process from NEI 04-10



PRA Risk-Evaluation

Follows Steps 8 through 14 of NEI 04-10



Completed STI changes (RMSC-0602)

- Spray Additive System, OG-12-409
- Containment Spray Nozzles, OG-12-409
- Reactor Trip Breaker, OG-12-409
- ESFAS Manual Initiation, OG-15-321
- RCS Operational Leakage, OG-15-396
- Containment Air Locks, PWROG-15067-P
- Control Room Emergency Filtration System (CREFS) Actuation, PWROG-15078-P
- DC Battery Charger, PWROG-15079-P
- AC Sources – Operating (Diesel Generator Simultaneous Start), PWROG-15080-P

Evaluations In-Progress

- Remote Shutdown System
 - SR 3.3.4.2: Verify required control circuit and transfer switch is capable of performing the intended function
 - 18 months to 36 months
- Reactor Trip System Instrumentation
 - SR 3.3.1.9: Perform trip actuating device operational test
 - 3 months to 6 months
- DC Sources – Operating (Battery Test)
 - SR 3.8.4.3: Verify batter capacity is adequate to supply, and maintain in OPERABLE status ...
 - 18 months to 36 months

2. Risk-Evaluation Approaches of SR Frequency Improvement via RITSTF Initiative-5b

Risk-Evaluation Approaches

- Qualitative Assessment
- Bounding Analysis
- Quantitative Assessment

Qualitative Assessment Approach

- Performed when components associated with STI changes are not explicitly modeled in PRA
- Provides indication of the impact of STI change on plant risk with no use of numerical values in the assessment
- Qualitative considerations of component include (but not limited to):
 - Can its failure contribute to an initiating event?
 - Is it credited for prevention or mitigate an event that can impact CDF or LERF?
 - Past industry and plant-specific performance history

Example for evaluation using qualitative assessment approached was provided in the paper.

Bounding Analysis Approach

- Performed when components associated with STI changes are not explicitly modeled in PRA, but implicitly included in the model at the IE, mitigating system, or functional level
- Provides indication of the impact of STI change on plant risk with use of some numerical values in the assessment
- Risk impacts (Δ CDF and Δ LERF) are generally determined via simplified hand or spreadsheet calculations
- Acceptance criteria (from NEI 04-10): $< 1\text{E-}07/\text{yr}$ for Δ CDF and $< 1\text{E-}08/\text{yr}$ for Δ LERF

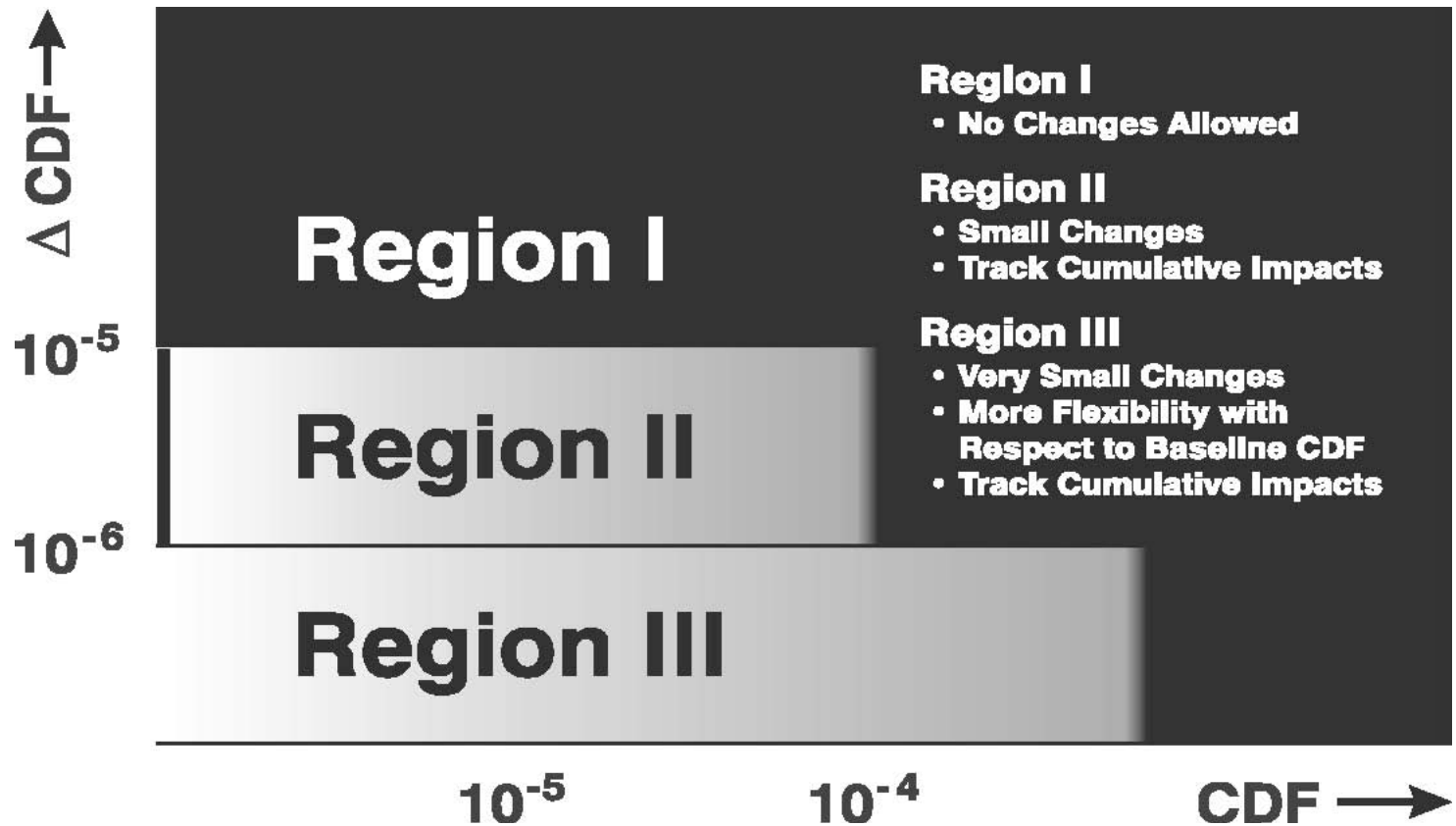
Example for evaluation using bounding analysis approached was provided in the paper.

Quantitative Analysis Approach

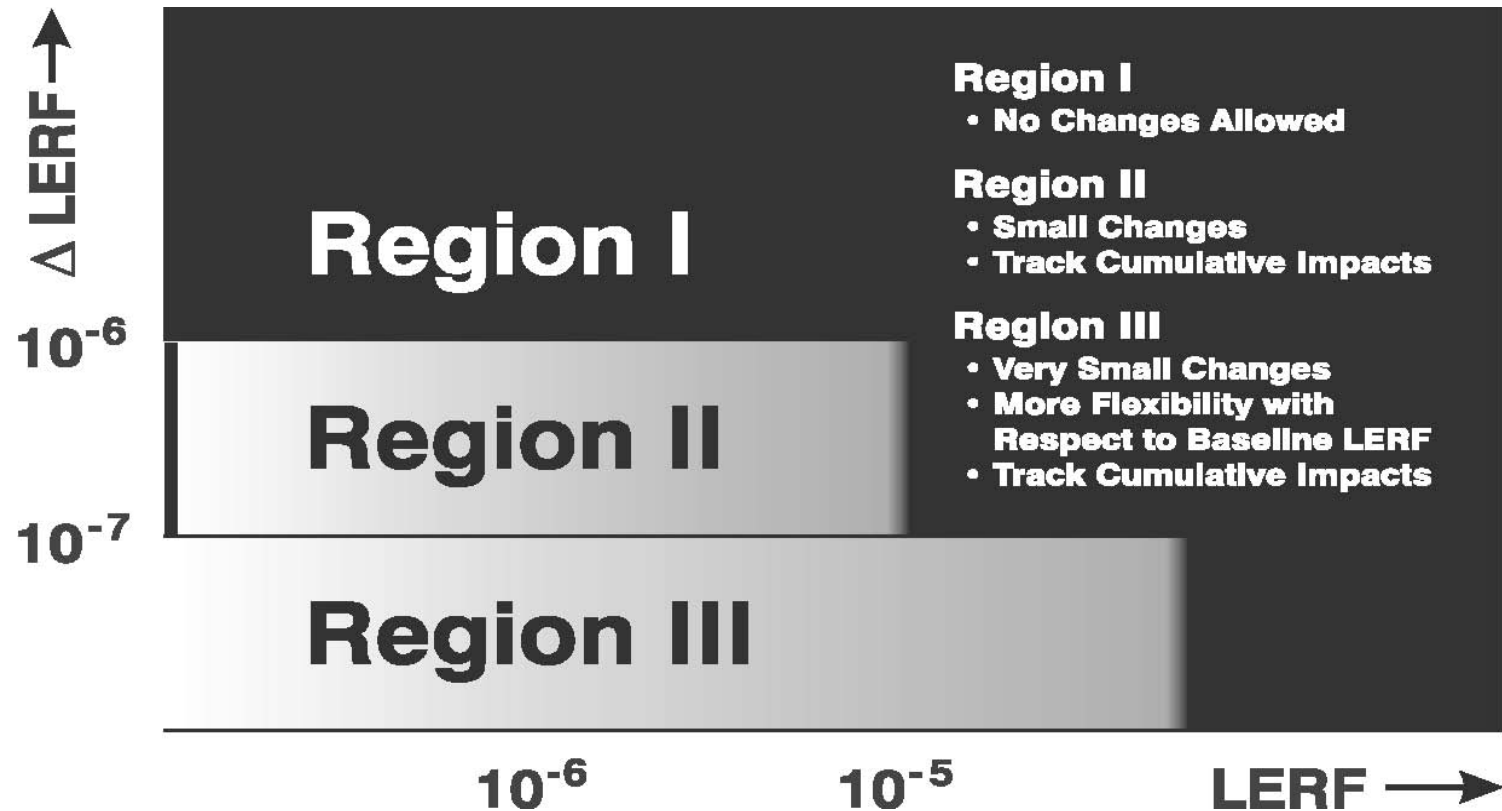
- Performed when components associated with STI changes is (or can be) explicitly modeled in PRA model
- Assess using plant-specific or representative PRA model
- Provides numerical indication of the impact of STI change on plant risk with change in CDF and LERF

Example for evaluation using quantitative analysis approached was provided in the paper.

Acceptance Guidelines (CDF) from RG 1.174



Acceptance Guidelines (LERF) from RG 1.174



Other Important Elements not discussed

- Regulatory Assessment
- Defense-In-Depth
- Safety Margins
- External and Shutdown Events Assessment
- Sensitivity Analyses
- Operational Experience (Plant surveys, INPO search)
- Performance Monitoring

More detailed guidance on RI Initiative-5b methodology can be found in NEI 04-10, RG 1.174, RG.1.177.

Questions

