

# Industry Recommended Areas for Improvement in BTP 7-19

## NRC and NEI Conference Call on Common Cause Failure

September 14, 2016



# Topics

- Re-cap of August 22<sup>nd</sup> meeting industry points on CCF
- BTP 7-19 Areas for Improvement
  - Summary of Comment Categories
  - Examples of Comments in Each Category
  - Dialogue on Specific Comments

***The Objective for this Meeting is to Understand the Comments vs. Resolve Them***

# August 22 Meeting – Industry Points on CCF (1 of 2)

1. Scope of systems for which CCF is a concern [8-22 meeting, slide 3]
2. Scope of CCF sources that must be analyzed [8-22 meeting, slide 10]
3. There are two parts to a D3 analysis: (1) a CCF vulnerability analysis and (2) a CCF coping analysis. Part 2 is only conducted when Part 1 concludes there is a CCF vulnerability. [8-22 meeting, slide 5]
4. The purpose of the CCF vulnerability analysis is to identify potential CCF vulnerabilities, and assess the defensive measures in place to prevent a CCF from those vulnerabilities:
  - a. This assessment requires reasonable assurance that a source of CCF has been prevented, not 100% assurance. Reasonable assurance is defined by achieving a CCF likelihood that is equivalent or less than other sources of CCF that are excluded from deterministic safety analysis, such as an earthquake that exceeds the plant's design basis, an EMI source that exceeds the EQ envelope, a maintenance error, an operator error, etc. [Discussed at the 8-22 meeting]
  - b. Therefore, the list of effective defensive measures that can be credited to achieve reasonable assurance must be expanded beyond just 100% testability and diversity (i.e., add the P measures in NEI 16-XX, including non-concurrent triggers). [8-22 meeting, slide 7]

## August 22 Meeting – Industry Points on CCF (2 of 2)

5. When a CCF vulnerability cannot be precluded, a CCF coping analysis is conducted, as follows:
  - a. Best estimate methods and acceptance criteria may be used for beyond design basis CCF sources (e.g., design defect); conservative methods and acceptance criteria must be used for CCF sources that are within the design basis (e.g., shared hardware resource). **[8-22 meeting, slide 6]**
  - b. A CCF that affects a mitigation function is considered coincident with each AOO or PA, including a Loss of Offsite Power (LOOP); the basis is that this CCF is hidden. **[8-22 meeting, slide 6]**
  - c. A digital CCF does not need to be considered coincident with an AOO/PA and LOOP; the basis is that a LOOP is a CCF and two independent CCFs due not need to be considered. **[8-22 meeting, slide 6]**
  - d. For a CCF that affects a transient initiator (e.g., feedwater control system, ESF spurious actuation), the transient is considered with no other concurrent AOO, PA or LOOP; the basis is that this CCF is self-announcing. **[8-22 meeting, slide 6]**
6. A demonstration of coping is also considered a demonstration of bounding for 50.59 Question 6, when the safety margin for the plant level end-result is maintained consistent with previous FSAR analysis. **[8-22 meeting, slide 9]**

***These Points are Reflected in the Industry Comments on BTP 7-19***

# BTP 7-19 Comment Summary

**74 Comments assigned to 16 categories, listed below:**

- 8-22 Meeting Comments\* (14)
- General Comments (5)
- Scope (10)
- Vulnerability Assessment (13)
- Point 1 (2)
- Coping (6)
- Diversity (3)
- Bounding (4)
- Manual Controls (2)
- Spurious Actuation (5)
- 100% Testing (2)
- Complexity (1)
- NUREG/CR-6303 (1)
- Common Cause Failure (2)
- Defensive Measures (3)
- Editorial\* (1)

*\* Will Not Review These Today*

# General Comments for Discussion

- Comment 3 – Beyond Design Basis (Page 2)
  - This is problematic in the 50.59 process
- Comment 7 – Guidance versus Regulation (Page 5)
  - BTP is only available reference point for interpretation of the SRM on SECY-93-087.
  - Shearon Harris Inspection noted that “...the BTP was intended to provide guidance.... ...and not as criteria to implement digital modifications...” (ADAMS ML13224A290, Page 7).

# Scope - Discussion

## Numerous Comments - Mixture of Different System and Functional Terms

- “Digital Protection System”
- “Software-based or software-logic-based RTS or ESF”
- “Auxiliary supporting features and other auxiliary features as appropriate”
- “Safety-related trip and actuation systems”
- “..focus should be on protection systems”
- “digital safety systems”
- “...digital equipment in the RTS or ESF”

***Example – Comment # 60 – Use of “safety function” and applicability of Appendix A of SRP Chapter 18 to an applications like Chiller Controls***

# Vulnerability Assessment - Discussion

- Diversity and Defense in Depth analyses are applied after the vulnerability assessment.
  - Comment 12, 13, 27... – SRM demonstration of vulnerability assessment before diversity and defense-in-depth
  - Comment 10 – (page 5), Comment 74 (page 20) Changes in Revisions to BTP 7-19
  - Comment 54 – (page 14) – Reasonable Assurance versus 100% Assurance
  - Comment 55 – (page 14) - Coping and Methods



# Diversity - Discussion

- Comment 24 – (Page 8) Emphasis on diversity
- Comment 40 (page 12) – “Sufficient Diversity”
- Comment 54 (page 14) – Adequacy of Diversity

# Coping & Bounding - Discussion

- Comment 18 (page 7), Comment 33 (page 11), Comment 72 (page 19) - Use of other analyses to support coping (SBO, etc)
- Comment 19 Use of bounding and coping concepts in the document - (page 7), Comment 56 (page 15), Comments 63 to 65 (page 16)

# Spurious Actuation - Discussion

- Scope, applicability, coincidence with AOO/PAAAs. Comment 29 (page 10), Comments 32, 34, 35.... (page 11)

# Defensive Measures - Discussion

- Comment 26 (page 9), Comment 37 (page 11)  
– Changes in BTP revisions to discount use of defensive measures
- Comment 52 – (page 14) Why ok for the DAS and not other systems?

# Other Comments for Discussion?

