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NRC DISCUSSION ON COMMON CAUSE FAILURE

December 1, 2016

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Agenda

- Action items from previous meetings
- Update to Modernization Plan #1
- Scope of CCF consideration
- Bounding & Coping Analyses

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Action Items

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Action items

Public meetings held on:

- March 21, 2016
- June 7, 2016
- July 11, 2016
- August 22, 2016
- September 14, 2016

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Update to Modernization Plan #1

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MP #1

- The part of the Integrated Action Plan that describes activities related to CCF.
- Revision to this plan was in response to industry's request for guidance for addressing the potential for CCF in digital modifications or upgrades to auxiliary and support systems.

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Current Activities

- Develop guidance to address identified issues in BTP 7-19 for the evaluation of the D3 analyses to address CCF vulnerabilities for auxiliary and support systems
- Support and be compatible with proposed guidance for 50.59 licensing process, to the extent practical, and consistent with current NRC policy on CCF.
- Consider NEI 16-XX (if available) for applicability to the guidance being developed.
- Identify and document potential gaps within current policy, regulations, and guidance and make appropriate recommendations.

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Additional Activities

- Complete evaluation of existing position and regulations related to CCF.
- Consider the technical basis proposed by industry for the use of defensive measures, including P measures, to address CCF
- Summarize evaluation in a NRC technical basis document.
- Using the technical basis document, prepare SECY paper with staff's recommendation.

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Scope of CCF consideration

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Background

- NRC position on addressing CCF is described in SRM-SECY-93-087.
- Directions were implemented in BTP 7-19
- Applies to “the proposed I&C system.”
- NRC Policy is to assume software design errors are credible and therefore needs to be identified and addressed.
- BTP 7-19 refers to NUREG/CR-6303 for guidance on how to perform a D3 analysis.

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Scope of CCF Considerations

- Categorize Systems, Devices, and Software (SDS) on the basis of potential impact on safety.
- “Lower impact” could imply “easier to license.”
- BUT: 10CFR50.59 applies equally to ALL systems, so graduating is not a panacea.

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Scope of CCF Considerations

- SDS that are required to be safety-grade and perform safety functions.
- SDS that are needed to support the operation of safety-grade SDS (i.e., enable safety systems perform safety functions/actions specifically covered in design basis accident analysis).
- SDS that have the potential to place the plant in an unanalyzed condition as a result of CCF.

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Scope of CCF Considerations

- For RTS/ESFAS the guidance in BTP 7-19 applies.
- For other SDS, it is not clear as to whether all the acceptance criteria in BTP 7-19 apply.
- The objectives are to:
  - clarify to what extent the guidance in BTP 7-19 applies.
  - address the technical aspects to inform 50.59 licensing decisions.

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Bounding & Coping Analyses

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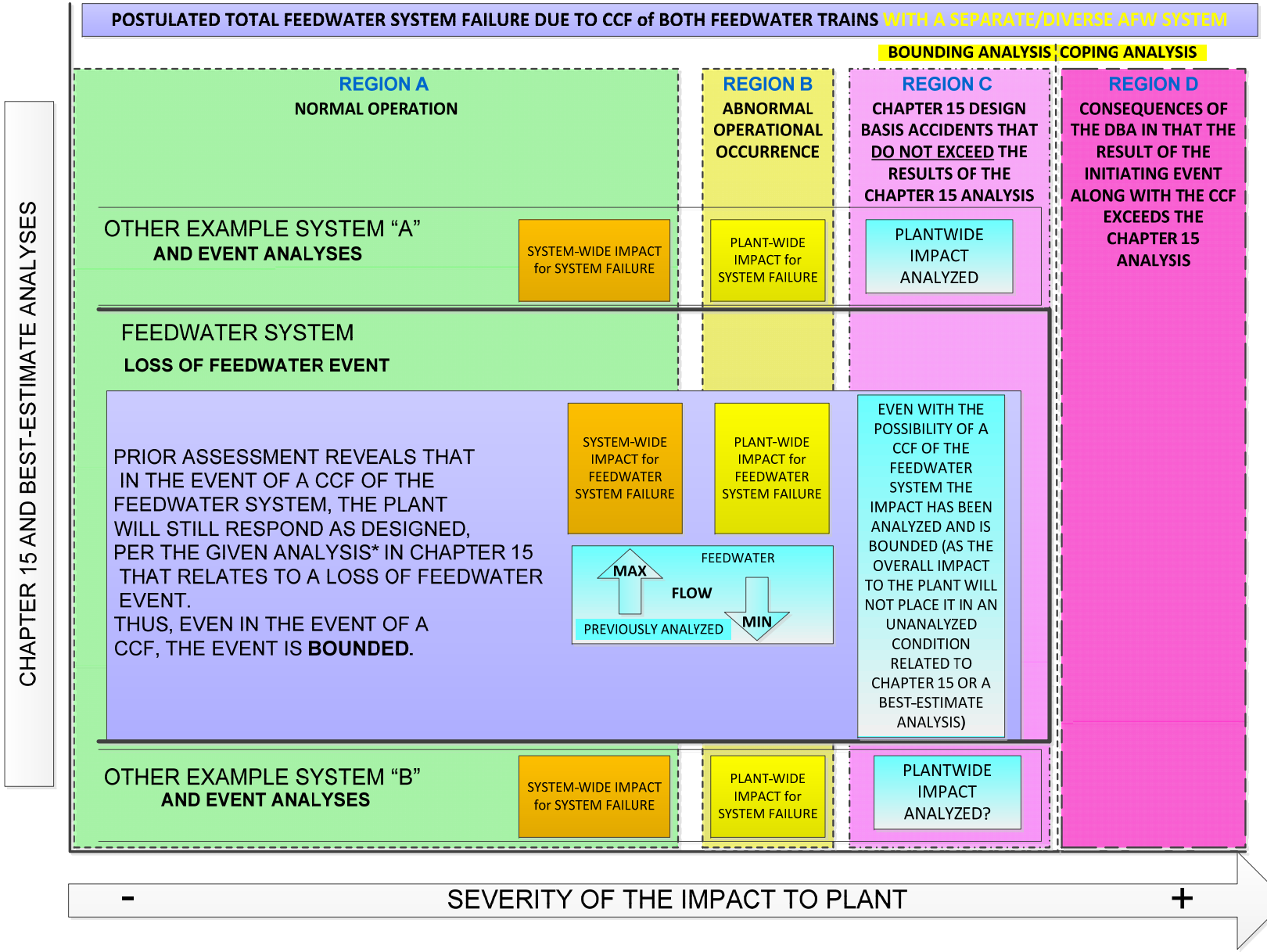
Bounding Analysis – Feedwater



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Bounding Analysis

An assessment that shows that the result of a postulated CCF, coincident with any design basis accident, falls within a design basis accident analysis.

- If the CCF results in a need for a new accident analysis, a successful bounding analysis would show that the results of that new accident do not exceed the results of any design basis accident analysis.

(This is a conceptual description, not a definition)

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Bounding Analysis – EPRI

- Bounding analysis is not defined
- Included in the description for coping analysis in Section 3.4.
  - "…comparison of the postulated event to a similar or bounding event for which the consequences have already been analyzed and are well understood."

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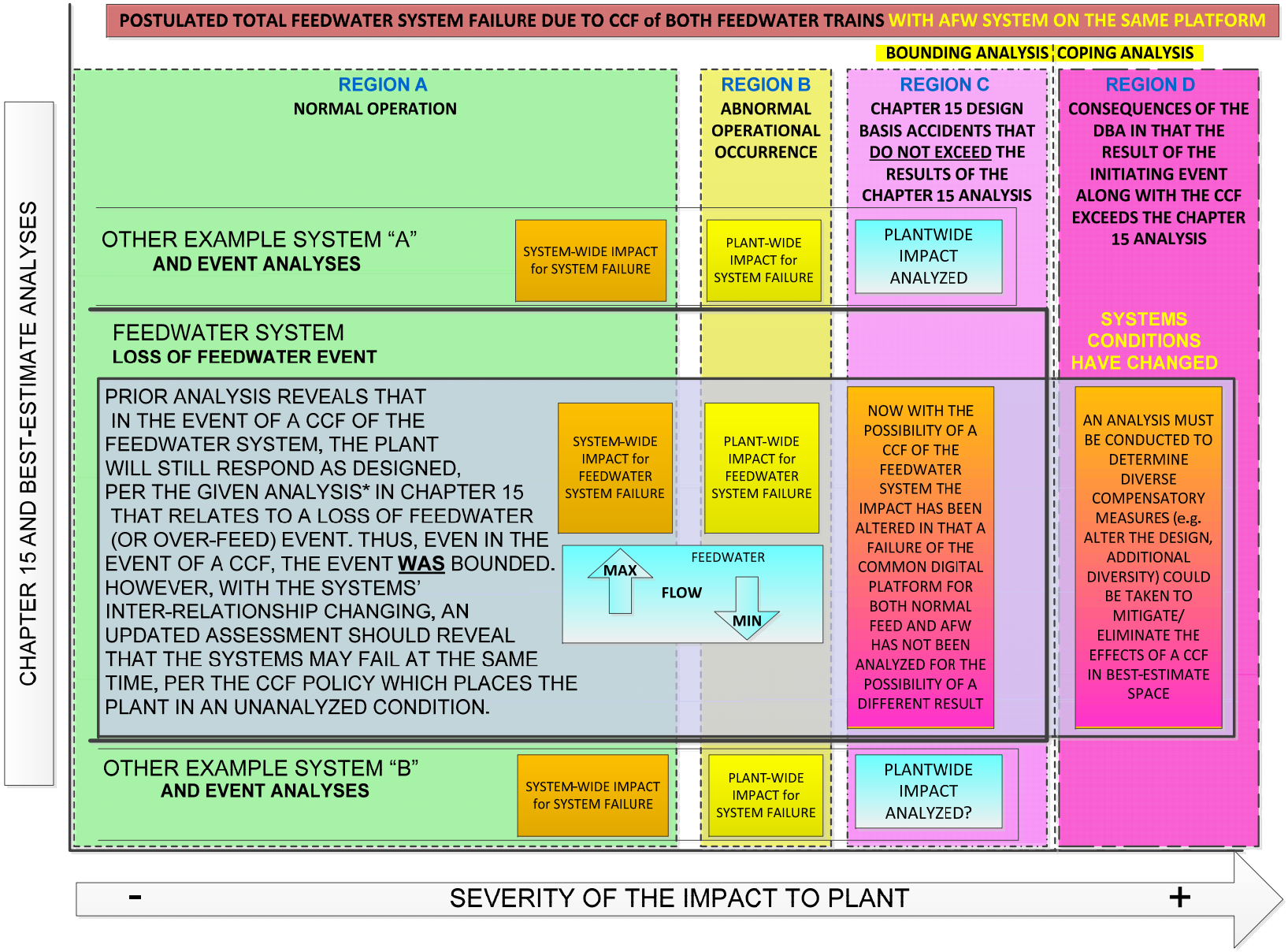
Coping Analysis – Feedwater



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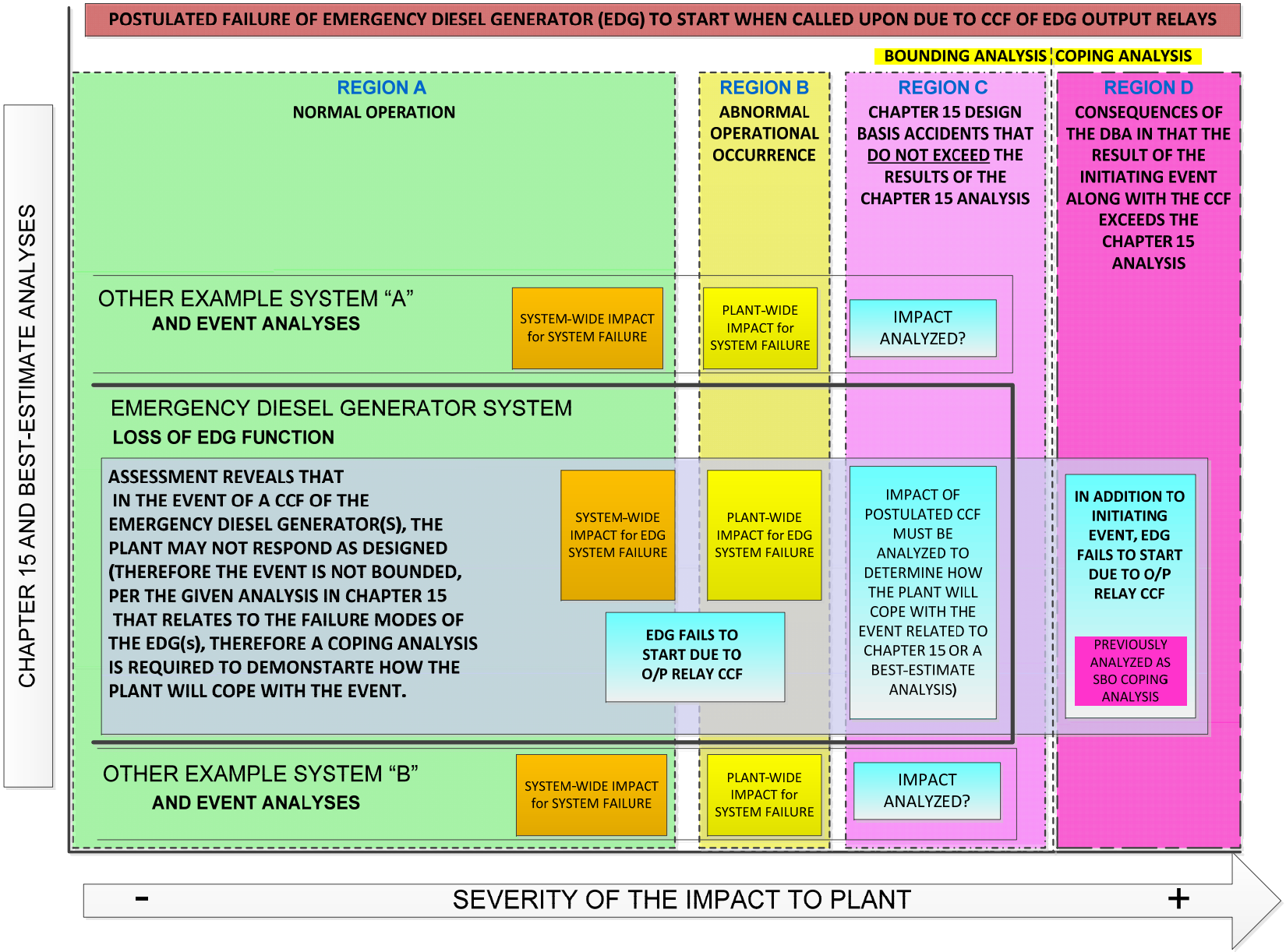
Coping Analysis – EDG Relays



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Coping Analysis

- An assessment that shows that the result of a postulated CCF, coincident with any design basis accident, falls outside of the design basis accident analysis.
- However the results may still be acceptable
  - The assessment would identify means (including operator actions) that would ensure safety despite the presence of the postulated CCF.

(This is a conceptual description, not a definition)

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Coping Analysis – EPRI

Defined in Section 2.1.

Described in Section 3.4 of the EPRI guide as:

- An analysis performed to determine if the consequences of I&C failures identified in the susceptibility analyses of Section 3.3 are acceptable at the plant or system level.

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Questions?

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Acronyms

BTP – Branch Technical Position within the Standard Review Plan – NUREG-0800

CCF – Common Cause Failure

D3 – Defense-in-Depth and Diversity

MP – Modernization Plan

NEI – Nuclear Energy Institute

NRC – Nuclear Regulatory Commission

P – Preventive measure

SDS – Systems, Devices, & Software