



Public Teleconference on Point Beach MCR Abandonment Analysis for Loss of Control Scenarios

April 6, 2015

Agenda

- **Purpose**
- **Alternate Shut Down Analysis for Loss of Control fire scenarios**
- **Compare the Alternate Shut Down Analysis for Loss of Control Analysis to FAQ 08-0054**

Acromyms / Definitions

- **ASD - Alternate Shutdown / MCR Abandonment**
- **LOC - Loss of Control / Loss of Function**
- **CCDP – Conditional Core Damage Probability**
- **CLERP – Conditional Large Early Release Probability**
- **PCS - Primary Control Station**
- **MCR – Main Control Room**
- **VFDR - Variances From Deterministic Requirement**
- **FRE – Fire Risk Evaluations**

Purpose

The purpose of this presentation is to explain the analysis and assumptions used to develop delta risk estimates for the Point Beach Nuclear Plant fire scenarios that may lead to abandonment of the Main Control Room or alternate shutdown implementation due to loss of control.

Alternate Shutdown (ASD) Fire Areas

Fire areas for which the safe shutdown local control procedure applies:

- **Fire Area A24 – 4KV Vital Switchgear Room**
- **Fire Area A30 – Cable Spread Room**
- **Fire Area A31 – Main Control Room**

VFDR Identification

VFDR Identification for ASD Fire Areas

- The Variances From Deterministic Requirements (VFDRs) identification approach at St. Lucie and Point Beach are different since Point Beach has no identified Primary Control Station (PCS) outside of the MCR.
- The VFDRs are identified assuming the operators remain in the MCR.
- The only PCS at Point Beach is the MCR. Therefore, ASD for LOC does not eliminate any VFDRs.
- Identifying VFDRs without considering ASD for LOC provides a bounding list of VFDRs and simplifies the analysis.
- This is the same approach as non-ASD areas for Point Beach.

ASD Fire Area Analysis for LOC Scenarios

ASD Fire Area Variant (Post-Transition) Case Overview

- **The variant case assumes the operators will not implement ASD for LOC fire scenarios.**
 - The operators are assumed to maintain command and control from the MCR.
 - The calculated risk without applying ASD is considered to be conservative, due to the potential to credit additional recovery actions with ASD.

ASD Fire Area Analysis for LOC Scenarios

ASD Fire Area Compliant Case Overview

- **Step 1 – Evaluate Compliant Case CCDP/CLERP values without ASD implementation for LOC.**
- **Step 2 – Evaluate Compliant Case CCDP/CLERP values with ASD implementation for LOC.**
 - This provides a bounding estimate of a single train shutdown path to validate step 1 results.
- **Step 3 – Apply the lower CCDP/CLERP from either step 1 or step 2 for each fire scenario to final compliant results.**
 - Results in a lower bound compliant case risk which maximizes transition delta risk.

ASD Fire Area Analysis for LOC Scenarios

ASD Fire Area Compliant Case Overview Step 1 without ASD Implementation

- **Step 1 – Evaluate Compliant Case CCDP/CLERP values without ASD implementation for LOC.**
 - The compliant case evaluates conditional core damage probabilities (CCDPs) and conditional large early release probability (CLERP) with the identified VFDRs corrected.
 - With VFDRs corrected, there is always one or more available paths to shutdown the plant. Therefore, LOC due to fire damage does not occur in the compliant model.

ASD Fire Area Analysis for LOC Scenarios

ASD Fire Area Compliant Case Overview Step 2 with ASD Implementation

- **Step 2 provides CCDP/CLERP based on implementing ASD utilizing one shutdown train.**
 - The compliant plant risk is expected to be bounded by this value.
 - The value calculated in step 2 is compared to step 1 to provide insight into the reasonableness of the step 1 results.
- **CCDP/CLERP are developed using equipment identified in the safe shutdown local control procedure.**
 - CCDP is 0.19 (CLERP is 0.019)
 - Represents the unavailability and reliability of the associated equipment.
 - Gas Turbine Generator (G-05)
 - Turbine-Driven Pump (1/2-P-29)
 - » Including minimum flow recirculation valve
 - Does not include human error while executing local control procedure.

ASD Fire Area Analysis for LOC Scenarios

ASD FireArea Compliant Case Overview Step 3

- **Step 3 – Apply the lower CCDP/CLERP from either step 1 or step 2 for each fire scenario to final compliant results.**
 - The updated model results supporting the 120-day RAI responses show that CCDP and CLERP with shutdown from the MCR (Step 1) resulted in lower compliant values because multiple paths are generally available for mitigation.
 - Therefore the results of step 2 were never applied.

Comparison to FAQ 08-0054

FAQ 08-0054 Guidance

- **B.2.2.4.2.a Variant vs. Compliant Condition**
 - Pre-transition actions not at the Primary Control Station characterized as alternative shutdown may not have a single deterministically compliant condition for comparison purposes.
 - One option would be to define a ‘compliant case’ that is not based on the actual fire area configuration, but based on a configuration that meets the deterministic criteria of Section 4.2.3.

Comparison to FAQ 08-0054

FAQ 08-0054 Guidance

- **B.2.2.4.2.b, Perform Fire Risk Evaluation**

Change in Risk Calculation

- Change in risk is the difference between the aggregate risk for the condition associated with the VFDR and the aggregate risk for the deterministically compliant condition.
- The compliant condition is created by manipulating the Fire PRA to 'remove' the VFDR(s).

Comparison to FAQ 08-0054

Point Beach Analysis vs FAQ 08-0054

- **Point Beach Analysis meets the guidance in FAQ 08-0054 B.2.2.4.2.a Variant vs. Compliant Case**
 - Consistent with FAQ 08-0054 the compliant case is not based on the actual fire area configuration, but based on a configuration that meets the deterministic criteria of Section 4.2.3 of NFPA 805 (one train available for shutdown). The compliant case assumed that the plant would be shutdown from the MCR and does not credit ASD for LOC fire scenarios.
- **Point Beach Analysis meets the guidance in FAQ 08-0054 B.2.2.4.2.b for Change in Risk Calculation**
 - The analysis is consistent with the above guidance for the change in risk calculation since the analysis compares the risk of the variant case with a deterministically compliant case.

Characterization of Transition Delta Risk

- **The variant model does not credit ASD for LOC fire scenarios, which can result in higher variant risk estimates. This is considered to have a conservative impact on the delta risk calculation.**
- **VFDRs for ASD fire areas are identified without crediting ASD for LOC. This is considered to have a conservative impact on the delta risk calculation.**

The FRE delta risk calculations meet FAQ 08-0054 guidance.

Closing

The treatment of the variant and compliant case with the resulting delta risk calculation for fire scenarios relating to possible ASD for LOC provides a conservative estimate of the delta risk for transition to NFPA 805 and meets the guidance in FAQ 08-0054.

Questions?

Appendix

Related RAI Response Previously Submitted

Some aspects discussed in this presentation are discussed in greater detail within the RAI response for the Point Beach NFPA 805 application.

- **RAI PRA 16 – Calculation of VFDR delta CDF and Delta LERF**
 - MCR abandonment for LOC discussion
 - FAQ 08-0054 guidance utilization
- **RAI PRA 16.01 – Calculation of Change-in-Risk**
 - Expanded discussion to clarify RAI 16