

Task 2.3.2 - Characterize Fire Ignition Sources: and

Task 2.3.3 - Identify Nearest and Most Vulnerable Ignition or Damage Targets:

Task 2.3.4 - Fire Ignition Source Screening: (Using NUREG-1805 or Zone of Influence Chart)

Source	Expected HRR	High Confidence HRR	Source Location	Nearest Target (Include distance)	Screens Out	
					High Confidence HRR	Expected HRR only

Task 2.3.5 - Finding Screening Check:

- O All identified fire ignition sources screened out in Task 2.3.4. The Phase 2 analysis is complete and the finding should be assigned a Green significance determination rating. Subsequent analysis tasks and steps need not be completed.
- O One or more of the fire ignition sources is retained, even if only at the higher severity value. The analysis continues to Step 2.4.

Step 2.4 - Fire Frequency for Unscreened Fire Sources:

Task 2.4.1 - Nominal Fire Frequency Estimation:

Task 2.4.2 - Findings Quantified Based on Increase in Fire Frequency: and

Task 2.4.3 - Credit for Compensatory Measures that Reduce Fire Frequency:

Unscreened Fire Sources	Nominal Fire Frequency	Severity Factor (SF _i)	Fire Frequency Increase Multiplier (AF _{i2.4.2})	Compensatory Measures Multiplier (AF _{i2.4.3})	Revised Fire Frequency
Total ($\sum F_{\text{Source } i} \times SF_i \times AF_{i2.4.2} \times AF_{i2.4.3}$):					

$$\Delta CDF_{2.4} = (\sum F_{\text{Source } i} \times SF_i \times AF_{i2.4.2} \times AF_{i2.4.3}) \times DF \times CCDP_{2.1}$$

= _____

Task 2.4.4 - Finding Screening Check:

Compare the updated change in CDF value, given the newly calculated fire frequency reflecting only the unscreened fire sources, with the values in the table below.

Phase 2, Screening Step 4 Quantitative Screening Criteria		
Assigned Finding Category (from Step 1.1):	$\Delta CDF_{2.4}$ screening value	
	Moderate Degradation	High Degradation
Fire Prevention and Administrative Controls	1E-5	1E-6
Fixed Fire Protection Systems	1E-5	
Fire Confinement	1E-5 ¹	
Localized Cable or Component Protection	1E-5 ¹	
Post-fire SSD	1E-6	

¹ This entry applies to both 'Moderate A' and 'Moderate B' findings against a fire barrier.

- O $\Delta CDF_{2.4}$ is lower than the corresponding value in the table above - the finding screens to Green and the analysis is complete.
- O $\Delta CDF_{2.4}$ is greater than or equal to the corresponding value in the table above. The analysis continues to Step 2.5

Step 2.5 - Definition of Specific Fire Scenarios and Independent SSD Path Second Screening Assessment:

Task 2.5.1 - Identify Specific Fire Growth and Damage Scenarios:

Task 2.5.2 - Identify Specific Plant Damage State Scenarios: and

Task 2.5.3 - Assess Fire Scenario-Specific SSD Path Independence:

Unscreened Fire Ignition Sources	FDS State	Plant Damage State Scenarios	Scenario-Specific SSD Path Independence (Yes / No)	Worst Case FDS (✓)	Revised Fire Frequency for Unscreened Fire Sources (from Step 2.4)	CCDP _i (from task 2.1.2 or 2.1.3)	Revised Fire Frequency x CCDP _i
Total ($\sum F_{\text{Source } i} \times SF_i \times AF_{i \ 2.4.2} \times AF_{i \ 2.4.3} \times CCDP_{i2.1}$):							

$$\Delta CDF_{2.5} = (\sum F_{\text{Source } i} \times SF_i \times AF_{i \ 2.4.2} \times AF_{i \ 2.4.3} \times CCDP_{i2.1}) \times DF$$

= _____

Task 2.5.4 - Screening Check:

If the SSD path cannot be credited for any of the identified fire ignition sources given its worst-case damage state, then Step 2.5.4 is complete, and the analysis continues with Step 2.6.

If the SSD path can be credited for at least one fire ignition source, then the screening check is performed based on the values and criteria provided in the table below:

Phase 2, Screening Step 5 Quantitative Screening Criteria		
Assigned Finding Category (from Step 1.1):	$\Delta\text{CDF}_{2.5}$ screening value	
	Moderate Degradation	High Degradation
Fire Prevention and Administrative Controls	1E-5	1E-6
Fixed Fire Protection Systems	1E-5	
Fire Confinement	1E-5 ¹	
Localized Cable or Component Protection	1E-5 ¹	
Post-fire SSD	1E-6	

¹ This entry applies to both 'Moderate A' and 'Moderate B' findings against a fire barrier.

- O The value of $\Delta\text{CDF}_{2.5}$ is lower than the corresponding value in the table above. The finding Screens to Green, and the analysis is complete.
- O The value of $\Delta\text{CDF}_{2.5}$ exceeds the corresponding value in the table above. The analysis continues to Step 2.6.

**Step 2.6 -
Fire Growth and Damage Time Analysis:**

and

**Step 2.7 -
Non-Suppression Probability Analysis**

(All times in nearest whole minute - damage times rounded down, detection/suppression and manual response times up)

Unscreened Fire Damage State Scenarios	Time to Damage	Detection Time	$(T_{\text{Damage}} - T_{\text{Detection}})$	Fixed Suppression Actuation Time	$(T_{\text{Damage}} - T_{\text{Suppression}})$

Task 2.7.4 - Probability of Non-Suppression:

Unscreened Fire Damage State Scenarios	PNS _{fixed}	PNS _{manual}	PNS _{scenario <i>i</i>}

Task 2.7.5 - Finding Screening Check:

The estimated risk contribution or screening CDF, for each fire scenario is based on the product of the following factors:

$$\Delta CDF_{2.7} = DF \times (\sum F_{\text{Source } i} \times SF_i \times AF_{i 2.4.2} \times AF_{i 2.4.3} \times CCDP_{i 2.1} \times PNS_{\text{scenario } i})$$

If $\Delta CDF_{2.7}$ is less than or equal to 1E-6, then the finding screens to Green, and the analysis is complete. If $\Delta CDF_{2.7}$ is greater than 1E-6, then the analysis continues to Step 2.8.

Step 2.8 - Plant Safe Shutdown Response Analysis

Using the appropriate plant initiating event worksheet(s) from the plant risk-informed inspection notebook, carry out the guidance provided under Step 2.8 of Appendix F, to account for the plant SSD response and required human recovery actions in order to quantify the factor “CCDP_i” for each fire growth and damage scenario of interest.

Step 2.9 - Quantification and Preliminary Significance Determination

Calculate a final quantification of the FDS scenarios of interest and assign a preliminary determination of a findings significance.

The estimated risk contribution or screening CDF, for each fire scenario is based on the product of the following factors:

$$\Delta CDF_{2.8} = DF \times \sum_{i=1}^n [F_i \times SF_i \times AF_{i 2.4.2} \times AF_{i 2.4.3} \times PNS_i \times CCDP_i]_{\text{All Scenarios}}$$

Where:

n	=	number of fire scenarios evaluated for a given finding (covering all relevant FDSs)
DF	=	Duration factor from Step 1.4
F _i	=	Fire frequency for the fire ignition source i from Task 2.4.1
SF _i	=	Severity factor for scenario i from Task 2.4.1
AF _{i 2.4.2}	=	Ignition source specific frequency adjustment factor from Task 2.4.2
AF _{i 2.4.3}	=	Ignition source specific frequency adjustment factor from Task 2.4.3
PNS _i	=	Probability of non-suppression for scenario i from Step 2.7
CCDP _i	=	Conditional core damage probability for scenario i from Step 2.8

If $\Delta CDF_{2.8}$ is less than or equal to 1E-6, then the finding screens to Green, and the analysis is complete. If $\Delta CDF_{2.8}$ is greater than 1E-6, then the finding is potential safety significant.

END