IMC 0609 Appendix F Attachment 1

Part 1: Fire Protection SDP Phase 1 Worksheet

**Facility:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step 1.1 - Provide Statement of Fire Inspection Finding**

|  |
| --- |
| Provide a clear statement of fire inspection finding and the specific non-compliance: |

**Step 1.2 - Assign a Fire Inspection finding Category**

A fire finding can only be in one category. Please indicate finding category by checking one of

the circles:

|  |  |  |
| --- | --- | --- |
| **Category of Fire Inspection Finding** | | |
| Finding Category | | Elements Covered by Each Category |
| O | **1.4.1 Fire Prevention and administrative Controls** | * The plant combustible material controls program * Other administrative controls such as work permit programs * Hot work fire watches * Roving or periodic fire watches (other than in category 1.4.2, below) * Training programs |
| O | **1.4.2 Fixed Fire Protection Systems** | * Fixed fire detection systems * Fixed fire suppression systems (automatic or manual) * Fire watches posted as a compensatory measure for a fixed fire protection system outage or degradation |
| O | **1.4.3 Fire Confinement** | * Fire barrier elements that separate one fire area from another * Penetration seals * Water curtains * Fire and/or smoke dampers * Fire doors |
| O | **1.4.4 Localized Cable or Component Protection** | * Passive physical features installed for the thermal/fire protection of cables, cable raceways, or individual components * Raceways or component fire barriers (e.g., cable wraps) * Radiant heat shields protecting a component or cable * Spatial separation (e.g., per App. R Section III.G.2) |
| O | **1.4.5 Post-fire Safe Shutdown (SSD)** | * Systems or functions identified in the post-fire SSD analysis * Systems or functions relied upon for post-fire SSD * Post-fire SSD component list (e.g., completeness) * Post-fire SSD analysis (e.g., completeness) * Post-fire plant response procedures * Operator manual actions * Alternate shutdown (e.g., control room abandonment) * Circuit failure modes and effects (e.g., spurious operation issues) |
| O | **1.4.6 Manual Firefighting** | * Hose Station * Fire Extinguishers * Fire pre-plans |
| O | **1.4.7 Fire Water Supply** | * Fire pumps * Yard loop piping * Water Sources |

**Step 1.3 - Ability to Achieve Safe Shutdown**

1.3. A Question: Is the reactor able to reach and maintain safe shutdown (either hot or

cold) condition?

O Yes – Screens to Green, no further analysis required.

O No – Continue to next question.

|  |
| --- |
| Provide supporting information that may be needed for documentation: |

1.3. B Question: Based on the criteria in Appendix F, Attachment 2, is the finding assigned a

“Low” degradation rating?

O Yes – Screens to Green, no further analysis required.

O No – Continue to question below.

|  |
| --- |
| Provide Explanation of “Low” Degradation Rating: |

**Step 1.4 - Qualitative Screening Question Set for Seven Individual Categories**

Proceed to applicable category below to further screen the finding.

### 

### 1.4.1: Fire Prevention and Administrative Controls

1.4.1. A Question: Would the impact of the fire finding be limited to equipment which is not

important to safety?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.1. B Question: Would the impact of the fire finding be limited to no more than one train/division of equipment important to safety?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.1. C Question: If the fire finding is associated with the presence of transient combustibles,

were there sufficient transient combustibles such that they could challenge

either a fire barrier or a safe shutdown analysis boundary?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to next question.

1.4.1. D Question: If the fire finding is associated with the presence of transient combustibles, did the transient combustibles involve self-igniting materials (e.g., oily rags)?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to next question.

1.4.1. E Question: If the fire finding is associated with the presence of transient combustibles, did the transient combustibles involve a gallon or more of low flashpoint (having a flashpoint less than 200°F) flammable or combustible liquids in a non-approved container?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to next question.

1.4.1. F Question: If the fire finding is associated with the presence of transient combustibles, did the transient combustibles involve in excess of 1 lb of a flammable gas?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to next question.

1.4.1. G Question: Is the fire finding associated with the presence of an ignition source (e.g., evidence of portable heater)?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to next question.

1.4.1. H Question: Is the fire finding associated with the presence of an ignition source (e.g.,

evidence of recent cigarette smoking)?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to next question.

1.4.1. I Question: Is the fire finding associated with a failure to implement a hot work fire watch capable of suppressing a fire from hot work which could impact equipment important to safety?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to Step 1.5.

## 1.4.2: Fixed Fire Protection Systems

1.4.2. A Question: If the fire finding involves a slightly code-deviant fire suppression system (e.g., automatic sprinkler coverage or fire water supply system), could the suppression system still protect the targets (such as cable raceways that contain cables critical for safe shutdown) in this fire area?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.2. B Question: Would the impact of the fire finding be limited to equipment which is not important to safety?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.2. C Question: Would the impact of the fire finding be limited to no more than one train/division of equipment important to safety?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.2. D Question: For a fire finding involving fixed detection systems which provide an alarm only function (i.e., not used to activate a fire suppression system), would the fire finding result in more than a 5 minute delay in the detection of a fire large enough to damage equipment important to safety?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to next question.

1.4.2. E Question: Does the finding affect only a manually actuated suppression system for an area which is accessible by the fire brigade?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.2. F Question: Are fixed ignition sources in the area affected by the Fixed Fire Protection System finding?

O Yes – Continue to next question, no further analysis required.

O No – Screen to Green, no further analysis required.

1.4.2. G Question: Would the affected fixed fire suppression system still be able to suppress a

fire such that no additional equipment important to safety would be affected by a fire?

O Yes – Screen to Green, no further analysis required.

O No – Continue to Step 1.5.

**1.4.3: Fire Confinement**

1.4.3. A Question: For findings involving fire doors, is the combustible loading on both sides of the wall representative of a fire duration less than 1.5 hours (i.e., less than 120,000 Btu/ft2)?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question..

1.4.3. B Question: Will the barrier in its degraded condition provide a 1-hour or greater fire endurance rating?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.3. C Question: Is a fully functional automatic suppression system on either side of the fire barrier?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.3. D Question: The exposed fire area contains no potential damage targets that are unique from those in the exposing fire area (damage targets may include post-fire safe shutdown components or other plant components whose loss might lead to a demand for safe shutdown (e.g., a plant trip))?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.3. E Question: For a wall fire barrier finding, involving equipment (such as a pipe) penetrating the barrier, is the equipment neither combustible nor capable of propagating a fire (such as cables in conduit)?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.3. F Question: For a fire inspection finding pertaining to a wall fire barrier deficiency, is there

equipment important to safety (i.e. from a different safe shutdown train) within 10 feet horizontally on the other side, or vertically above, in the adjoining compartment, that can be affected by cable fire spreading through an opening in the wall fire barrier (e.g., a cable that pass through multiple fire areas)?

O Yes – Continue to Step 1.5.

O No – Screen to Green, no further analysis required.

### 

### 1.4.4: Localized Cable or Component Protection

1.4.4. A Question: Does an automatic suppression system protect the area where the cable or

component protection is affected by the fire finding?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.4. B Question: Is a fully functional detection system in the area, and would the fire barrier provide at least 20 minutes of fire endurance?

O Yes – Screen to Green, no further analysis required.

O No – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

### 

### 1.4.5: Post-fire Safe-shutdown (SSD)

1.4.5. A Question: Could the fire cause secondary fires outside of the originating fire area due to circuit issues?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to next question.

1.4.5. B Question: Does the fire finding affect the ability to reach and maintain a stable plant condition within the first 24 hours of a fire event?

O Yes – Continue to next question.

O No – Screen to Green, no further analysis required.

1.4.5. C Question: Could the fire result in a piece of equipment required for safe shutdown not being available?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to next question.

1.4.5. D Question: Could the finding result in a failure to reach a stable condition (such as due to a substantial flow diversion)?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to next question.

1.4.5. E Question: Would the finding result in a delay in excess of 10 minutes for performing

required actions necessary within 1 hour?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to Step 1.5.

### 

### 1.4.6: Manual fire fighting

1.4.6. A Question: Is the fire finding associated with portable fire extinguishers not used for hot work fire watches?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.6. B Question: Is the fire finding associated with pre-fire plans?

O Yes – Screen to Green, no further analysis required.

O No – Continue to next question.

1.4.6. C Question: Is the fire finding associated with an observed fire drill deficiency or equipment deficiency which could have delayed suppression of a fire by more than 5 minutes?

O Yes – Continue to SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

O No – Continue to Step 1.5.

### 

### 1.4.7: Fire Water Supply

1.4.7. A Question: Would at least 50% of required fire water capacity (flow at required pressure) still be available?

O Yes – Screen to Green, no further analysis required.

O No – Continue to Step 1.5.

**Step 1.5 - Initial Quantitative Screening**

**1.5.1: Assign a Duration Factor (DF)**

The duration factor is the length of time (days divided by 365) that the noted performance degradation was, or will be, in existence (i.e., the duration of the degradation) rounded up as shown in Table 2. If the exposure time is greater than 30 days, the duration factor, DF, is always treated as 1.

Please indicate duration of fire finding by checking one of the circles.

|  |  |  |
| --- | --- | --- |
| **Duration Factor** | | |
|  | Duration of Degradation | Duration Factor Value(DF) |
| O | Less than 3 Days | 0.01 |
| O | 3 to 30 Days | 0.1 |
| O | Greater than 30 Days | 1.0 |

**1.5.2: Estimate the Fire Frequency for the Fire Area (from Generic Fire Area Fire Frequency Table)**

Estimation of fire frequency (F) for the fire area can be found using the generic fire area fire frequencies in Table 3 below. These values are from NUREG/CR 6850. Please document the fire finding by checking the applicable circle in the left column.

|  | **Generic Fire Area Fire Frequencies, F (NUREG/CR 6850)** | | |
| --- | --- | --- | --- |
|  | **Room Identifier/Limited Specific Fire Findings** | **Ignition Source** | **Generic Fire Frequency**  **(per rx yr)** |
| O | Battery Room | Batteries | 7.5E-04 |
| O | Containment (PWR) | Reactor Coolant Pump | 6.1E-03 |
| O | Containment (PWR) | Transients and Hotwork | 2.0E-03 |
| O | Control Room | Main Control Board | 2.5E-03 |
| O | Control/Aux/Reactor Building | Cable fires caused by welding and cutting | 1.6E-03 |
| O | Control/Aux/Reactor Building | Transient fires caused by welding and cutting | 9.7E-03 |
| O | Control/Aux/Reactor Building | Transient | 3.9E-03 |
| O | Diesel Generator Room | Diesel Generators | 2.1E-02 |
| O | Plant-Wide Components | Air compressors | 2.4E-03 |
| O | Plant-Wide Components | Battery chargers | 1.8E-03 |
| O | Plant-Wide Components | Cable fires caused by welding and cutting | 2.0E-03 |
| O | Plant-Wide Components | Cable-Run (Self-ignited cable fires) | 4.4E-03 |
| O | Plant-Wide Components | Dryers | 2.6E-03 |
| O | Plant-Wide Components | Electric Motors | 4.6E-03 |
| O | Plant-Wide Components | Transients | 9.9E-03 |
| O | Plant-Wide Components | Ventilation Subsystems | 7.4E-03 |
| O | Transformer Yard | Transformer - Catastrophic | 6.0E-03 |
| O | Transformer Yard | Transformer – Non Catastrophic | 1.2E-02 |
| O | Transformer Yard | Yard transformers (Others) | 2.2E-03 |
| O | Turbine Building | Boiler | 1.1E-03 |
| O | Turbine Building | Cable fires caused by welding and cutting | 1.6E-03 |
| O | Turbine Building | Main Feedwater Pumps | 1.3E-02 |
| O | Turbine Building | Turbine Generator Excitor | 3.9E-03 |
| O | Turbine Building | Turbine Generator Hydrogen | 6.5E-03 |
| O | Turbine Building | Turbine Generator Oil | 9.5E-03 |
| O | Turbine Building | Transient fires caused by welding and cutting | 8.2E-03 |
| O | Turbine Building | Transients | 8.5E-03 |

**1.5.3: Fire Non-Suppression Probability (S)**

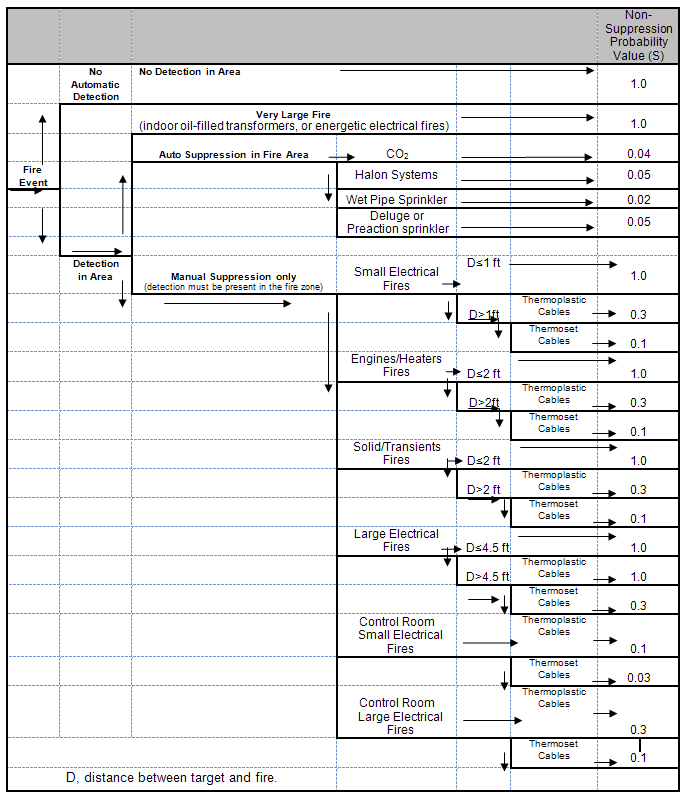
Fire Non-Suppression Probability(S) is the likelihood that a fire would not be suppressed before potential damage is done to safe shutdown cables, safety-related cables, or safety-related equipment located in the fire area. The selection of S is based on the Non-Suppression decision tree and engineering judgment. The S value for a fire finding is determined by following the decision path in Figure 2 that best describes the fire finding.

For example, if the fire is judged to be a very large fire, such as, an indoor oil-filled transformer or energetic electrical fire, then the S value would be equal to 1. This value indicates that there would be damage to the target equipment before the fire could be suppressed.

If the fire is in a fire area protected by a wet-pipe auto suppression system, then following the branch from left to right would indicate an S value of 0.01. This value indicates that 99% of the time a fire would be suppressed before damage to target cables occurs. Please indicate characteristics of the fire finding by checking the applicable circle in each of the following categories.

| **Characteristics of Fire Finding** | |
| --- | --- |
| **Available Detection** | |
| O | No Detection in Area |
| O | Detection in Area |
| **Suppression Capability** | |
| O | Auto Suppression in Fire Area: CO2 Gaseous Suppression |
| O | Auto Suppression in Fire Area: Halon Suppression |
| O | Auto Suppression in Fire Area: Wet Pipe Sprinkler Suppression |
| O | Auto Suppression in Fire Area: Deluge or Preaction Sprinkler Suppression |
| O | Only Manual Suppression available |
| **Fire Type** | |
| O | Very Large Fire (e.g., indoor oil-filled transformer, or energetic electrical fires) |
| O | Small Electrical Fire (e.g., Vertical cabinets with qualified cable, fire limited to 1 cable bundle) |
| O | Engines/Heaters Fire (e.g., Diesel generators and auxiliary subsystems fire) |
| O | Solid/Transients Fire (e.g., cloth, paper, wood, plastics, any flammable material fire) |
| O | Large Electrical fire (e.g., Vertical cabinets with unqualified cable, fire in more than one cable bundle) |
| O | Control Room Small Electrical Fire (e.g., fire in localized areas extinguishable by hand-held extinguishers) |
| O | Control Room Large Electrical Fire (e.g., fire affecting a large number of items inside the main control board) |
| **Cable Type** | |
| O | Thermoplastic Cables or combination or unknown cable type |
| O | Thermoset Cables |
| **Distance Between Fire and Target** | |
| O | ≤ 1 ft |
| O | >1 ft and ≤ 2 ft |
| O | > 2 ft and ≤ 4.5 ft |
| O | > 4.5 ft |

**Figure A1.1 - Non-Suppression Probability Decision Tree**



The quantitative screening is based on a threshold value of E-6. Multiply the fire area duration factor from Task 1.5.1 by the fire frequency from Task 1.5.2, and by the non-suppression probability from Task 1.5.3 to generate an initial Phase 1 screening change in core damage frequency (ΔCDF) value. Since the conditional core damage probability (CCDP) has not been considered yet, it is unwritten, but with an assumed value of 1.0. This assumption provides a margin of conservatism.

∆CDF ≈ DF × F × S

If the finding impacts multiple fire areas, then the initial Phase 1 screening CDF value is based on the sum of the fire frequencies for all impacted fire areas as follows:

∆CDF ≈ DF × ∑(FAREA × SAREA)

Record the DF, F and S values and the change in core damage frequency in Table 5.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table A1.1 - Change in Core Damage Frequency** | | | | |
|  | Duration of Degradation (DF) | Area Fire Frequency (F) | Non-Suppression Probability (S) | ∆CDF |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
|  |  |  | ∆CDF Total = |  |

* If ΔCDF is less than 1E-06, the fire finding screens to Green and the analysis is complete, and no further analysis is required.
* If ΔCDFis greater than or equal to 1E-06, then the fire finding does not screen to Green. The finding then has to be evaluated by the SDP Phase 2 Quantitative Screening Approach in IMC 0609, Appendix F.

**Step 1.6 - Screen by Licensee Fire PRA Results**

**1.6.1: Screen by Licensee PRA-based Safety Evaluation**

Based on results from licensee’s PRA evaluation, a determination can be made on if the finding is of very low risk significance.

1.6.1. A Question: If there is an approved fire PRA for this plant, does the licensee’s risk-based

evaluation for this fire finding indicate a ∆CDF of less than 1 E-6, and is the evaluation result accepted by a US NRC Senior Risk Analyst?

O Yes – Screen to Green, no further analysis required

O No – Continue to Phase 3 evaluation

|  |
| --- |
| Comments: |

**Part 2: Fire Protection SDP Phase 2 Worksheet**

**Facility:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Results from FP SDP Phase 1 Review: ∆CDF ≈ DF × ∑(FAREA × SAREA)= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Request and review the following licensee documents:

* The fire hazards analysis for the fire areas to be evaluated
* The post-fire safe shutdown analysis for the fire areas to be evaluated
* The licensee’s lists of required and associated circuits
* Post-fire operating procedures applicable to the fire areas to be assessed
* Documentation for any USNRC approved deviations or exemptions relevant to the fire areas to be assessed.

**Step 2.1 - Independent SSD Path First Screening Assessment**

**2.1.1: Identify the Designated Post-fire SSD Path**

The identified SSD path must meet the following criteria in order to be considered at this stage of the Phase 2 analysis:

* The SSD path must be identified as the designated post-fire SSD path in the plant’s fire protection program.
* The SSD path must be supported by a documented post-fire SSD analysis consistent with regulatory requirements.
* Use of the SSD path must be documented and included in the plant operating procedures.

SSD Path:

**2.1.2: Assess the Unavailability Factor for the Identified SSD Path**

CCDP2.1.2 = (SSD Unavailability Factor) = \_\_\_\_\_\_\_ (Credited as either 1.0, 0.1, or 0.01)

Basis for selection/comments:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If CCDP2.1.2 = 1.0, proceed to Step 2.2.

**2.1.3: Assess Independence of the Identified SSD Path**

Criteria satisfied:CCDP2.1.3 = CCDP2.1.2 = (SSD Unavailability Factor)

Criteria not satisfied:CCDP2.1.3 = 1.0. Proceed to Step 2.2

Basis for criteria not met/comments:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Task 2.1.4.: Screening Check

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| **Table A1.2 - Phase 2 Screening Step 1 Quantitative Screening Criteria** | | |
| **Assigned Finding Category (from Step 1.1):** | **Δ CDF2.1 Screening Value** | |
| **Moderate Degradation** | **High**  **Degradation** |
| Fire Prevention and Administrative Controls | N/A | 1E-6 |
| Fixed Fire Protection Systems | 1E-5 |
| Fire Confinement | 1E-5 |
| Localized Cable or Component Protection | 1E-5 |
| Post-fire SSD | 1E-6 |

* Δ CDF2.1 is lower than the corresponding value in Table A1.2 - the finding screens to Green and the analysis is complete.
* Δ CDF2.1 is greater than or equal to the corresponding value in Table A1.2. The analysis continues to Step 2.2

**Step 2.2 - Fire Damage State Determination**

**2.2.1: Initial FDS Assignment**

(Check all that apply from O FDS1

Appendix F, Table 2.2.1) O FDS2

O FDS2

Basis for selection (s)/FDS3 assessment/comments:

**2.2.2: Screening Assessment for FDS3 Scenarios**

If the finding category assigned in Step 1.1 is “Fire Confinement,” retain the FDS3 scenarios and continue the analysis with Step 2.3. For all other finding categories, conduct a screening check for the FDS3 scenarios based on the following questions:

Question 1: Does the fire barrier separating the exposed and the exposing fire areas have a non-degraded 2-hour or greater fire endurance rating?

O Yes – FDS3 scenarios screen out, continue to Step 2.3.

O No – Continue to next question

Question 2: Is there a non-degraded automatic gaseous room-flooding fire suppression system either in the exposed or in the exposing fire area?

O Yes – FDS3 scenarios screen out, continue to Step 2.3.

O No – Continue to next question

Question 3: Is there a non-degraded or no more than moderately degraded automatic full area water-based fire suppression system either in the exposed or in the exposing fire area?

O Yes – FDS3 scenarios screen out, continue to Step 2.3.

O No – Continue to next question

Question 4: Can it be determined that the exposed fire area contain no potential damage targets that are unique from those in the exposing fire area (damage targets may include post-fire safe shutdown components or other plant components whose loss might lead to a demand for safe shutdown (e.g., a plant trip))?

O Yes – FDS3 scenarios screen out, continue to Step 2.3.

O No – Continue to next question

Question 5: If the exposed fire area does contain post-fire safe shutdown components or components whose fire-induced failure might lead to a demand for safe shutdown, are all such components located at least 20 feet from the intervening fire barrier, and/or provided with passive fire protection with a minimum one-hour fire endurance rating?

O Yes – FDS3 scenarios screen out, continue to Step 2.3.

O No – Continue to next question

Question 6: Is a partial-coverage automatic water based fire suppression system installed in the exposing fire area and are all the fixed or *in-situ* fire ignition sources included within the zone of coverage for this system?

O Yes – FDS3 scenarios screen out, continue to Step 2.3.

O No – Continue to next question

Question 7: Does the fire barrier provide a minimum of 20 minutes fire endurance protection and

are the fixed or *in situ* fire ignition sources and combustible or flammable materials in the exposing fire area positioned such that, even considering fire spread to secondary combustibles, the barrier will not be subject to direct flame impingement?

O Yes – FDS3 scenarios screen out, continue to Step 2.3.

O No – Retain the FDS3 scenarios and continue the analysis with Step 2.3.

**Step 2.3 - Fire Scenario Identification and Ignition Source Screening**

**2.3.1: Identify and Count Fire Ignition Sources**

(Use the worksheet on the following pages)

| **Table A1.3 - Fire Frequency Evaluation Worksheet** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Nuclear Power Plant:** | |  | | | | |
| **Description of the Plant Area of Interest:** | | |  | | | |
| **Identifier/Designator of the Plant Area:** | | |  | | | |
| **Ignition Source Bin** | | **# of Items or**  **Level** | **Individual Base Fire Frequency** | **Associated Frequency** | **Comments** | **Associated HHRs** |
| **Cables - Non-Qualified**  (Low/Medium/High) (See Attachment 4) | |  | 1.6E-05/4.8E-04/  1.4E-03 |  |  | Initial 70kW  See  Attachments 3 and 5 |
| **Electrical Cabinets:** | | | | | | |
| Switchgear Cabinets | Thermal |  | 5.5E-05 |  |  | 70kW, 200kW |
| High Energy |  | 4.7E-06 |  |  | See  Attachment 5 |
| General Electrical Cabinets | |  | 6.0E-05 |  |  | 70kW, 200kW |
| General Control Cabinets | |  | 6.0E-05 |  |  | 200kW, 650kW |
| MCR and MCR Service Cabinets | |  | 4.8E-03 |  |  | 200kW, 650kW |
| **Electric Motors:** | | | | | | |
| Electric Motors (<100HP) | |  | 6.5E-04 |  |  | 70kW, 200kW |
| Electric Motors (**≥**100HP) | |  | 6.5E-04 |  |  | 200kW, 650kW |
| **Generators - General:** | | | | | | |
| Diesel Generators | |  | 5.6E-03 |  |  | 70kW, 200kW |
| Gas Turbine Generators | |  | 3.2E-04 |  |  | 70kW, 200kW |
| Reactor Protection System MG Sets | |  | 6.7E-04 |  |  | 70kW, 200kW |

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| **Ignition Source Bin** | | **# of items or** | **Individual Base Fire** | **Associated Frequency** | **Comments** | **Associated HHRs** |
| **Hydrogen Sources:** | | | | | | |
| Hydrogen Recombiner (BWR) | |  | 5.5E-03 |  |  | See  Attachment 5 |
| Hydrogen Storage Tanks (Yes / No) | |  | 6.5E-04 |  |  | See  Attachment 5 |
| Hydrogen Piping - Charged (Yes / No) | |  | 9.7E-04 |  |  | See  Attachment 5 |
| **Hot Work** (Low/Medium/High)  (See Attachment 4) | |  | 2.3E-05/6.9E-05/  6.9E-04 |  |  | See  Attachment 5 |
| **Main Turbine- Generator Set:** | | | | | | |
| T/G Exciter Fire (Yes / No) | |  | 1.4E-03 |  |  | 70kW, 200kW |
| T/G Oil Fires (Yes / No) | |  | 1.7E-03 |  |  | See  Attachment 5 |
| T/G Hydrogen Fire (Yes / No) | |  | 1.4E-03 |  |  | See  Attachment 5 |
| **Miscellaneous Components:** | | | | | | |
| Air Compressors (<100HP) | Motor Fire |  | 1.5E-04 |  |  | 70kW, 200kW |
| Oil Fire |  | 1.0E-04 |  |  | See  Attachment 5 |
| Air Compressors (≥100HP) | Motor Fire |  | 1.5E-04 |  |  | 200kW, 650kW |
| Oil Fire |  | 1.0E-04 |  |  | See  Attachment 5 |
| Battery Banks | |  | 1.9E-04 |  |  | 70kW, 200kW |
| Boiler Heating Units | |  | 9.7E-04 |  |  | See  Attachment 5 |
| Electric Dryers | |  | 5.4E-04 |  |  | 70kW, 200kW |
| Ventilation Subsystems | |  | 6.0E-05 |  |  | 70kW, 200kW |

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| **Ignition Source Bin** | | **# of Items or** | **Individual Base Fire** | **Associated Frequency** | **Comments** | **Associated HHRs** |
| **Pumps:** | | | | | | |
| Reactor Coolant Pump (PWR) | Motor Fire |  | 6.2E-04 |  |  | 200kW, 600kW |
| Oil Fire |  | 3.1E-04 |  |  | See  Attachment 5 |
| Reactor Feed Pump (BWR) | Motor Fire |  | 8.4E-05 |  |  | 200kW, 650kW |
| Oil Fire |  | 8.4E-04 |  |  | See  Attachment 5 |
| Main Feedwater Pumps | Motor Fire |  | 2.7E-04 |  |  | 200kW, 650kW |
| Oil Fire |  | 2.7E-03 |  |  | See  Attachment 5 |
| Other Pumps (<100HP) | Motor Fire |  | 5.0E-05 |  |  | 70kW, 200kW |
| Oil Fire |  | 5.0E-05 |  |  | See  Attachment 5 |
| Other Pumps (≥100HP) | Motor Fire |  | 5.0E-05 |  |  | 200kW, 650kW |
| Oil Fire |  | 5.0E-05 |  |  | See  Attachment 5 |
| **Transformers:** | | | | | | |
| Transformers - Outdoor/Yard | |  | 4.2E-03 |  |  | 650kW, 10MW |
| Transformers - Indoor Dry | |  | 1.1E-04 |  |  | 70kW, 200kW |
| Transformers - Indoor Oil-Filled | |  | 1.1E-04 |  |  | 650kW, 2MW |
| **Transients** (Low/Medium/High)  (See Attachment 4) | |  | 5.5E-05/1.7E-04/  1.7E-03 |  |  | 70kW, 200kW  or See  Attachment 5 |

**2.3.2: Characterize Fire Ignition Sources and**

**2.3.3: Identify Nearest and Most Vulnerable Ignition or Damage Targets**

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

**Table A1.4**

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| Source# | **Source -**  **Description/Location** | **Number of Sources** | **From Table A1.3**  **Expected HRR** | **Severity Factor (SFi)** | **Identify Nearest Target** | **Target Distance (ft)**  **H R** | | **Critical**  **Distance (ft) (from Tables 2.3.2 thru 2.3.4)**  **H R** | | **Number of Sources Retained (i.e., Did not screen out)** |
| **High Confidence HRR** |
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Fire Area Dimensions: Width(ft) Highest HRR for sources not retained: \_\_\_\_\_\_kW

Depth (ft) Does this HRR result in damaging hot gas layer?

Height (ft) ○ Yes ○ No If yes, retain scenario.

(Attach printouts of any spreadsheet calculations utilized from NUREG-1805.)

**2.3.5: Finding Screening Check**

* 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.
* 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**

**2.4.1: Nominal Fire Frequency Estimation**

**2.4.2: Findings Quantified Based on Increase in Fire Frequency and**

**2.4.3: Credit for Compensatory Measures that Reduce Fire Frequency**

(Use the worksheet on the following page)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Table A1.5 - Step 2.4: Fire Frequency for Unscreened Fire Sources** | | | | | | | |
| **Source #** | **Unscreened Fire Source**  **at Specified HRR Value** | **Number of Sources Retained (Table A1.4)** | **Individual Base Fire Frequency**  **(Table A1.3)** | **Severity Factor**  **(SF*i*)**  **(Table A1.4)** | **Adjustment Factor for Fire Frequency Increase or Compensatory Measures\***  **(AFi 2.4)** | **Base Frequency Increase \*\*** | **Revised Fire Frequency for Unscreened Source** |
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| Total | | | | | | |  |

\* Adjustment Factor for Fire Frequency Increase applies only to “Fire Prevention and Administrative Controls” findings (see discussion under Task 2.4.2). Credit for Compensatory Measures applies only to transient or hot work sources (see discussion under Task 2.4.3).

\*\* Base frequency increases apply only to “Fire Prevention and Administrative Controls” findings within the combustible controls programs (see discussion under Task 2.4.2).

Assumptions/Comments/Remarks:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**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.

|  |  |  |
| --- | --- | --- |
| **Table A1.6 - Phase 2, Screening Step 4 Quantitative Screening Criteria** | | |
| **Assigned Finding Category (from Step 1.1):** | **ΔCDF2.4 screening value** | |
| **Moderate Degradation** | **High Degradation** |
| Fire Prevention and Administrative Controls | N/A | 1E-6 |
| Fixed Fire Protection Systems | 1E-5 |
| Fire Confinement | 1E-51 |
| Localized Cable or Component Protection | 1E-51 |
| Post-fire SSD | 1E-6 |

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

O Δ CDF2.4 is lower than the corresponding value in Table A1.6 - the finding screens to Green and the analysis is complete.

O Δ CDF2.4 is greater than or equal to the corresponding value in Table A1.6. 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 (Fixed Ignition Sources)

Task 2.5.2: Identify Specific Fire Growth and Damage Scenarios (Self-ignited Cable Fire, Transients. Hot Work)

Task 2.5.3: Identify Specific Plant Damage State Scenarios and

Task 2.5.4: Assess Fire Scenario-Specific SSD Path Independence

(Use the worksheet on the following page)

**Table A1.7**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Source#** | **Unscreened Fire Source**  **at Specified HRR Value** | **FDS**  **State**  **(carried forward unscreened from Table 2.2.1)** | **Plant Damage State Scenarios** | **Scenario-Specific SSD Path Independence**  **(Yes / No)** | **Worst Case FDS**  **()** | **Revised Fire Frequency for Unscreened Fire Sources**  **(from Table A1.5)** | **Weighting Factor\***  **(Attachment 5)** | **CCDPi**  **(from task 2.1.2 or 2.1.3)** | **Revised Fire Frequency x CCDPi** |
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\* Weighting factors apply only to transient and hot work sources (see Attachment 5).

Attach printouts of any spreadsheet calculations utilized from NUREG-1805.

Assumptions/Comments/Remarks:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**2.5.5: 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 2.5.5 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:

|  |  |  |
| --- | --- | --- |
| **Table A1.8 - Phase 2, Screening Step 5 Quantitative Screening Criteria** | | |
| **Assigned Finding Category (from Step 1.1):** | **ΔCDF2.5 screening value** | |
| **Moderate Degradation** | **High Degradation** |
| Fire Prevention and Administrative Controls | N/A | 1E-6 |
| Fixed Fire Protection Systems | 1E-5 |
| Fire Confinement | 1E-51 |
| Localized Cable or Component Protection | 1E-51 |
| Post-fire SSD | 1E-6 |

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

* The value of ΔCDF2.5 is lower than the corresponding value in Table A1.8. The finding Screens to Green, and the analysis is complete.
* The value of ΔCDF2.5 exceeds the corresponding value in Table A1.8. The analysis continues to Step 2.6.

**Step 2.6 -** and **Step 2.7 -**

**Fire Growth and Damage Time Analysis** **Non-Suppression Probability Analysis**

Attach printouts of any spreadsheet calculations utilized from NUREG-1805.

**Table A1.9**

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Source #** | **Unscreened Fire Damage State Scenarios** | **Time to Damage**  **(Attachment 7)** | **Detection Time**  **(Attachment 8)** | **(TDamage - TDetection)** | **Fixed Suppression Actuation Time**  **(Attachment 8 and NUREG-1805)** | **(TDamage - TSuppression )** |
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Assumptions/Comments/Remarks:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.7.4: Probability of Non-Suppression**

**Table A1.10**

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| **Source#** | **Unscreened Fire Damage State Scenarios** | **PNSfixed**  **(Table A8.2)** | **PNSmanual**  **(Table 2.7.1)** | **PNSscenario *i***  **(Attachment 8)** |
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Assumptions/Comments/Remarks:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.7.5: Screening Check**

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

**Table A1.11**

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| Source# | **Unscreened Fire Damage State Scenarios** | **Revised Fire Frequency x CCDPi**  **(FSource *i* X SF*i*  X AF*i* 2.4 X CCDP*i* 2.1.2 or 2.1.3)**  **(from Table A1.7)** | **PNSi**  **(from Table A1.10)** | **Revised Fire Frequency** |
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If ΔCDF2.7 is less than or equal to 1E-6, then the finding screens to Green, and the analysis is complete. If ΔCDF2.7 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 “CCDPi“ for each fire growth and damage scenario of interest.

Attach any internal event worksheets and manual action evaluation table determinations used to quantify each CCDPi.

(Use the worksheet on the following page)

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| **Table A1.12 - Step 2.8: Plant Safe Shutdown Response Analysis** | | | | | | | |
| **Source #** | **Unscreened Fire Damage State Scenarios** | **HEPi**  **(from Table 2.8.1 or 2.8.2)** | **PSPi**  **(from Table 2.8.3)** | **CCDP (given successful manual action)** | **CCDP (given manual action fails and spurious actuation)** | **CCDP (given manual action fails and no spurious actuation)** | **CCDPi** |
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CCDPi = [(1-HEPi) x CCDP(given successful manual action)] +

[HEPi x PSPi x CCDP(given manual action fails and spurious actuation)] +

[HEPi x (1 - PSPi) x CCDP(given manual action fails and no spurious actuation)]

where: HEPi is the true value of the human error probability for scenario i (not the exponent value derived from the HEP tables), and

PSPi is the probability of a spurious actuation for scenario I.

**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.

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| **Source #** | **Unscreened Fire Damage State Scenarios** | **Revised Fire Frequency for Unscreened Source (from Step 2.4)**  **(FSource i x SFi  x AFi 2.4)**  **(from Table A1.5)** | **Probability of Non-Suppression**  **(PNSi)**  **(Table A1.10)** | **CCDPi**  **(Table A1.12)** | **Revised Fire Frequency for Unscreened Source** |
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| Total | | | | |  |

Assumptions/Comments/Remarks:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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





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Where:

n = number of fire scenarios evaluated for a given finding (covering all relevant FDSs)

DF = Duration factor from Step 1.4

Fi = Fire frequency for the fire ignition source i from Task 2.4.1

SFi = Severity factor for scenario i from Task 2.4.1

AFi 2.4 = Ignition source specific frequency adjustment factors from Step 2.4

PNSi = Probability of non-suppression for scenario i from Step 2.7

CCDPi = Conditional core damage probability for scenario i from Step 2.8

If ΔCDF2.8 is less than or equal to 1E-6, then the finding screens to Green, and the analysis is complete. If ΔCDF2.8 is greater than 1E-6, then the finding is potential safety significant.

Attachment 1

Revision History for IMC 0609 Appendix F, Attachment 1

| Commitment Tracking Number | Accession Number  Issue Date  Change Notice | Description of Change | Description of Training Required and Completion Date | Comment and Feedback Resolution Accession Number |
| --- | --- | --- | --- | --- |
| N/A | 02/27/2001 | IMC 0609, App F, Att 1 (Application of Fire Protection Risk-Significant Screening Methodology to Hypothetical Cases) has been revised to update the examples to reflect the change made to Appendix F defining fire scenarios. | None | N/A |
| N/A | 05/28/2004 | IMC 0609, App F, Att 1 (Part 1: Fire Protection SDP Phase 1 Worksheet) is revised to provide the qualitative screening approach and guidance and worksheets for the inspectors to complete a phase 1 screening process of fire protection related findings. | None | N/A |
| N/A | 02/28/2005 | IMC 0609, App F, Att 1 (Attachment 1, part 1: Application of Fire Protection SDP Phase 1 Worksheet) is revised to correct the base fire frequency for non-qualified cables, medium loading in Table A1.3 on page F1-9. | None | N/A |

| Commitment Tracking Number | Accession Number  Issue Date  Change Notice | Description of Change | Description of Training Required and Completion Date | Comment and Feedback Resolution Accession Number |
| --- | --- | --- | --- | --- |
| N/A | ML13193A044  09/20/13  CN 13-022 | This update incorporates an expanded Phase 1. This was created in response to a large number of comments we received from the regional senior reactor analysts (SRAs) via the ROP feedback and the Risk Network initiative. Specific key improvements include: (a) inclusion of additional screening questions for each of the fire finding categories based on review of archived fire SDP items, fire data, and expertise that were not available at the previous release of Appendix F, (b) expansion of initial quantitative screening to include a non-suppression probability term, and (c) addition of an option to rely on licensees’ fire PRA assessment of fire findings under appropriate oversight. | None | ML 12249A185  ML 13039A091 |