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Document_Title: Nuclear Power Plant
Fire Modeling Application
Guide (NPP FIRE MAG)

Comments: Page 2-2
Page 2-2 states that "the input values necessary to determine LFSs should remain within the range of probability, but can exceed values expected to be likely or even probable." This sentence is confusing and needs to be reworded. It is actually the goal of RIPB analysis to show that the LFS is outside of the range of probability.

Page 2-5
Page 2-5 states that complex models can be used to check simple models. This is not common practice.

Pages 3-4, 9, 14, 20, 24, 29, 32
When identifying the location of a fire, one must consider the impact on the temperature of the hot gas layer as well as the layer height. Specifically when identifying a fire location in FDS, one must consider the consequences of placing the fire in the oxygen depleted "hot gas layer".

Page 3-21
On page 3-21, "Compartments with Complex Geometries", it is suggested that rooms of complex geometry can be accurately modeled as an orthogonal parallelepiped for use in simple models as long as the compartment height and surface area are conserved. It should be noted that this gross approximation has limited application.

Page A-9 and A-10
Page A-10 states that the air resistance from open drop ceilings is negligible. While it is possible that this may be true for an individual scenario, it is not always true especially when ceiling jet is moving perpendicularly to the diffusers in the proximity of the open grate ceiling. Thus, it is necessary to caution the users of such scenarios.

Page C-6
Not only does NUREG/CR-1824 not address a fire of this type, but this application of FDS is highly questionable. There is limited test data available to asses the validity of this calculation. Additionally, it is unlikely that a 0.2m cell size could adequately resolve the dynamics. It is recommended that this scenario be removed from the guide, as it encourages less experienced FDS users to believe that the results are within a reasonable range of certainty.

Page F-6
An experienced fire protection engineer should realize that the point source radiation calculation in zone models is not appropriate for this scenario. Additionally, 5 grid cells across the characteristic diameter of the fire cannot resolve the fire (as shown in Figure F-4).

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Page H-6
An experienced fire protection engineer should realize that the point source radiation calculation in zone models is not appropriate for this scenario. One should recognize that a zone model cannot accurately represent the fire plume given the scenario geometry. Additionally, there no mechanisms in zone models to predict sprinkler activation for sprinklers below the HGL.

In general, a more conservative position on the application of fire modeling to risk-informed performance based analysis should be considered. Many of the fire modeling strategies utilized in this document involve approaches that have not been validated and/or assumptions with only scenario specific validity. It is recognized that this document is intended to provide guidance, but including these type of examples may give the impression that these modeling strategies would be broadly acceptable for use in fire hazards analysis and fire PRA.

Many of the examples in this guide appear to have boiler plate text copied to each section. Please confirm that the text in each section is appropriate to the scenario in question. For instance, page 3-12 discusses mechanical ventilation and multiple compartments, when the scenario involves a single room without mechanical ventilation. Page 3-14 and 3-24 discuss targets in the fire plume, when there aren't any. Page 3-29 discusses time to target damage, for a scenario with no targets.

Analysis of thermally-induced electrical failure (THEIF, NUREG/CR-6931) is mentioned throughout the draft fire modeling guide. However, the THEIF model is not referenced by NUREG/CR-6850 nor has it been V&V'd by NUREG/CR-1824.

Target flammability is mentioned throughout the fire modeling guide. However, the ability of current software to accurately model flame spread has not been V&V'd by NUREG/CR-1824. It is suggested at this time that modeling of flammability be limited to direct application of empirical correlations.

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