H. NFPA 805 Frequently Asked Question Summary Table

2 Pages Attached

Note: The NFPA 805 FAQ process will continue through the transition of non-pilot NFPA 805 transition plants. Final closure of the FAQs will occur when RG 1.205, which endorses the new revision of NEI 04-02, is approved by the NRC. It is expected that additional FAQs will be written and existing FAQs will be revised as the NFPA 805 transition process continues.

This table includes the approved FAQs that have not been incorporated into the current endorsed revision of NEI 04-02 and utilized in this submittal:

Table H-1 - NEI 04-02 FAQs Utilized in LAR Submittal

No.	Rev.	Title	FAQ Ref.	Closure Memo
06-0008	9	NFPA 805 Fire Protection Engineering Evaluations	ML090560170	ML073380976
06-0022	3	Acceptable Electrical Cable Construction Tests	ML090830220	ML091240278
07-0030	5	Establishing Recovery Actions	ML103090602	ML110070485
07-0032	2	Clarification of 10 CFR 50.48(c), 10 CFR 50.48(a) and GDC 3 clarification	ML081300697	ML081400292
07-0035	2	Bus Duct Counting Guidance for High Energy Arcing Faults	ML091610189	ML091620572
07-0038	3	Lessons learned on Multiple Spurious Operations	ML103090608	ML110140242
07-0039	2	Lessons Learned - NEI B-2 Table	ML091420138	ML091320068
07-0040	4	Non-Power Operations Clarification	ML082070249	ML082200528
07-0042	0	Fire Propagation from Electrical Cabinets	ML080230438 ML091460350	ML092110537
08-0043	1	Electrical Cabinet Fire Location	ML083540152 ML091470266	ML092120448
08-0044	0	Large Oil Fires	ML081200099 ML091540179	ML092110516
08-0046	0	Incipient Fire Detection Systems	ML081200120 ML093220197	ML093220426
08-0047	1	Spurious Operation Probability	ML082770662	ML082950750
08-0048	0	Fire Ignition Frequency	ML081200291 ML092180383	ML092190457
08-0049	0	Cable Fires	ML081200309 ML091470242	ML092100274
08-0050	0	Non Suppression Probability	ML081200318 ML091680045	ML092190555
08-0051	0	Hot Short Duration	ML083400188 ML100820346	ML100900052

Table H-1 - NEI 04-02 FAQs Utilized in LAR Submittal

No.	Rev.	Title	FAQ Ref.	Closure Memo
08-0052	0	Transient Fire Growth Rate and Control Room Non-Suppression	ML081500500 ML091590505	ML092120501
07-0054*	1	Demonstrating Compliance with Chapter 4 of NFPA 805	ML103510379	ML110140183
09-0056	2	Radioactive Release Transition	ML102810600	ML102920405
08-0057	3	New Shutdown Strategy	ML100330863	ML100960568

*Note: The FAQ Submittal number was 08-0054 but the NRC Closure Memo for the FAQ was listed as 07-0054. 07-0054 was used to be consistent with the Closure Memo.

This table includes FAQs that have not been approved by the NRC but are utilized in this submittal based on industry concurrence with the guidance contained therein:

No.	Rev.	Title	FAQ Ref.	Closure Memo
10-0059**	1	NFPA 805 Monitoring	ML111180481	N/A

**Note: Section 4.6 of the transition report presents the monitoring program and is based on FAQ 10-0059 Rev. 1 which is the latest available copy at the time of this submittal but is still under review by the NRC.

I. Definition of Power Block

1 Page Attached

The structures in the Owner Controlled Area were evaluated in Callaway Plant Calculation KC-43, "NFPA 805 Code Comparison," to determine those structures that contain equipment that is required to meet the nuclear safety performance criteria and radioactive release performance criteria described in Section 1.5 of NFPA 805.

For the purposes of establishing the structures included in the Callaway Plant Fire Protection Program in accordance with 10 CFR 50.48(c) and NFPA 805, the buildings and structures listed in the following table are considered to be part of the power block.

Table I-1 – Power Block Definition

Power Block Structures	Fire Area(s)
Auxiliary Building	A-1, A-2, A-3, A-4, A-5, A-6, A-7, A-8, A-9, A-10, A-11, A-12, A-13, A-14, A-15, A-16, A-17, A-18, A-19, A-20, A-21, A-22, A-23, A-24, A-25, A-26, A-27, A-28, A-29, A-30, A-33
Auxiliary Boiler Room	AB-1
Control Building	C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8, C-9, C-10, C-11, C-12, C-13, C-14, C-15, C-16, C-17, C-18, C-19, C-20, C-21, C-22, C-23, C-24, C-25, C-26, C-27, C-28, C-29, C-30, C-31, C-32, C-33, C-34, C-35, C-36, C-37
Diesel Generator Building	D-1, D-2
ESW Pump House	UNPH, USPH
Fuel Building	FB-1
Radwaste Building	RW-1
Reactor Building	RB-1
Turbine Building (including communication corridor)	TB-1
UHS Cooling Tower	UNCT, USCT

J. Fire Modeling V&V

11 Pages Attached

Attachment J - Table J-1 - V & V Basis for Fire Models / Model Correlations Used

Calculation	Application	V & V Basis	Discussion
Flame Height (Method of Heskestad)	Calculates the vertical extension of the flame region of a fire.	• NUREG-1805, Chapter 3, 2004 • NUREG-1824, Volume 3, 2007 • SFPE Handbook, 4th Edition, Chapter 2-1, Heskestad, 2008	• The correlation is used in the NUREG-1805 fire model, for which V&V was documented in NUREG-1824. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability.
Plume Centerline Temperature (Method of Heskestad)	Calculates the vertical separation distance, based on temperature, to a target in order to determine the vertical extent of the ZOI.	• NUREG-1805, Chapter 9, 2004 • NUREG-1824, Volume 3, 2007 • SFPE Handbook, 4th Edition, Chapter 2-1, Heskestad, 2008 • NUREG/CR-6850, Appendix H – Damage Criteria, 2005	• The correlation is used in the NUREG-1805 fire model, for which V&V was documented in NUREG-1824. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability. • NUREG/CR-6850 generic screening damage criteria is used, which is considered conservative.

Attachment J - Table J-1 - V & V Basis for Fire Models / Model Correlations Used

Calculation	Application	V & V Basis	Discussion
Radiant Heat Flux (Point Source Method)	Calculates the horizontal separation distance, based on heat flux, to a target in order to determine the horizontal extent of the ZOI.	• NUREG-1805, Chapter 5. 2004 • NUREG-1824, , Volume 4, 2007 • SFPE Handbook, 4th edition, Chapter 3-10, Beyler, C., 2008 • NUREG/CR-6850, Appendix H - Damage Criteria, 2005	• The correlation is used in the NUREG-1805 fire model, for which V&V was documented in NUREG-1824. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability. • NUREG/CR-6850 generic screening damage criteria is used, which is considered conservative.
Plume Radius (Method of Heskestad)	Calculates the horizontal radius, based on temperature, of the plume at a given height.	• FIVE-Rev1, Referenced by EPRI Report 1002981, 2002 • SFPE Handbook, 4th Edition, Chapter 2-1, Heskestad, G., 2008 • NUREG/CR-6850, Appendix H - Damage Criteria, 2005	• The correlation is used in the FIVE-Rev1 fire model. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • NUREG/CR-6850 generic screening damage criteria is used, which is considered conservative.
Hot Gas Layer (Method of MQH)	Calculates the hot gas layer temperature for a room with natural ventilation.	• NUREG-1805, Chapter 2, 2004 • NUREG-1824, Volume 3, 2007 • SFPE Handbook, 4th Edition, Chapter 3-6, Walton W. and Thomas, P., 2008	• The correlation is used in the NUREG-1805 fire model, for which V&V was documented in NUREG-1824. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability.

Attachment J - Table J-1 - V & V Basis for Fire Models / Model Correlations Used

Calculation	Application	V & V Basis	Discussion
Hot Gas Layer (Method of Beyler)	Calculates the hot gas layer temperature for a closed compartment with no ventilation.	• NUREG-1805, Chapter 2, 2004 • NUREG-1824, Volume 3, 2007 • SFPE Handbook, 4th Edition, Chapter 3-6, Walton W. and Thomas, P., 2008	• The correlation is used in the NUREG-1805 fire model, for which V&V was documented in NUREG-1824. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability.
Hot Gas Layer (Method of Foote, Pagni, and Alvares [FPA])	Calculates the hot gas layer temperature for a room with forced ventilation.	• NUREG-1805, Chapter 2, 2004 • NUREG-1824, Volume 3, 2007 • SFPE Handbook, 4th Edition, Chapter 3-6, Walton W. and Thomas, P., 2008	• The correlation is used in the NUREG-1805 fire model, for which V&V was documented in NUREG-1824. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability.
Hot Gas Layer (Method of Deal and Beyler)	Calculates the hot gas layer temperature for a room with forced ventilation.	• NUREG-1805, Chapter 2, 2004 • NUREG-1824, Volume 3, 2007 • SFPE Handbook, 4th Edition, Chapter 3-6, Walton W. and Thomas, P., 2008	• The correlation is used in the NUREG-1805 fire model, for which V&V was documented in NUREG-1824. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability.

Attachment J - Table J-1 - V & V Basis for Fire Models / Model Correlations Used

Calculation	Application	V & V Basis	Discussion
Ceiling Jet Temperature (Method of Alpert)	Calculates the horizontal separation distance, based on temperature at the ceiling of a room, to a target in order to determine the horizontal extent of the ZOI.	• FIVE-Rev1, Referenced by EPRI Report 1002981, 2002 • NUREG-1824, Volume 4, 2007 • SFPE Handbook, 4th Edition, Chapter 2-2, Alpert, R., 2008 • NUREG/CR-6850, Appendix H - Damage Criteria, 2005	• The correlation is used in the FIVE-Rev1 fire model, for which V&V was documented in NUREG-1824. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability. • NUREG/CR-6850 generic screening damage criteria is used, which is considered conservative.
Hot Gas Layer Calculations using Fire Dynamics Simulator (Version 5)	Used to calculate the hot gas layer temperatures for various compartments, and the layer height.	• FDS Version 5 • NIST Special Publication 1018-5, Volume 2: "Verification" • NIST Special Publication 1018-5, Volume 3: "Validation" • NUREG-1824, Volume 7, 2007	• V&V of the FDS is documented in NIST Special Publication 1018-5. • The V&V of FDS specifically for Nuclear Power Plant applications has also been documented in NUREG-1824. • It was concluded that FDS models the hot gas layer height, temperature and smoke concentration in an appropriate manner. Furthermore, the predictions of HGL height and temperature are deemed to be within the bounds of experimental uncertainty.

Attachment J - Table J-1 - V & V Basis for Fire Models / Model Correlations Used

Calculation	Application	V & V Basis	Discussion
Sprinkler Actuation Calculation using Fire Dynamics Simulator (Version 5)	Used to estimate sprinkler actuation timing based on ceiling jet temperature, velocity, and thermal response of sprinkler.	• FDS Version 5 • NIST Special Publication 1018-5, Volume 2: "Verification" • NIST Special Publication 1018-5, Volume 3: "Validation" • NUREG-1824, Volume 7, 2007	• V&V of the FDS is documented in NIST Special Publication 1018-5. • The V&V of FDS (for ceiling jet temperature) specifically for Nuclear Power Plant applications has also been documented in NUREG-1824. • It was concluded that FDS models the ceiling jet temperature and sprinkler actuation in an appropriate manner. Furthermore, the predictions are deemed to be within the bounds of experimental uncertainty.
Hot Gas Layer Calculations using CFAST (Version 6)	Calculates the upper and lower layer temperatures for various compartments, the layer height, and smoke obscuration.	• NIST Special Publication 1086, 2008 • CFAST Version 6 • NUREG-1824, Volume 5, 2007	• V&V of the CFAST code is documented in the NIST Special Publication 1086. • The V&V of CFAST specifically for Nuclear Power Plant applications has also been documented in NUREG-1824. • It was concluded that CFAST models the hot gas layer height, temperature and smoke concentration in an appropriate manner. Furthermore, the predictions of HGL height and temperature are deemed to be within the bounds of experimental uncertainty.

Attachment J - Table J-1 - V & V Basis for Fire Models / Model Correlations Used

Calculation	Application	V & V Basis	Discussion
Smoke Detection Actuation Correlation (Method of Heskestad and Delichatsios)	Alpert Ceiling Jet used to determine temperature and Heskestad and Delichatsios temperature to smoke density for smoke detection timing estimates.	• NUREG-1805, Chapter 11, 2004 • NUREG-1824, Volume 4, 2007 • SFPE Handbook, 4th Edition, Chapter 4-1, Custer R., Meacham B., and Schifiliti, R., 2008 • SFPE Handbook, 4th Edition, Chapter 2-2, Alpert, R., 2008	• The smoke detection correlation is used in the NUREG-1805 fire model. • Alpert's ceiling jet correlation V&V is documented in NUREG-1824. • The temperature to smoke density correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability.
Heat Detection Actuation Correlation	Alpert Ceiling Jet used to determine temperature for heat detection timing estimates.	• NUREG-1805, Chapter 11, 2004 • NFPA Handbook, 19th Edition, Chapter 3-9, Budnick, E., Evans, D., and Nelson, H., 2003	• The heat detection correlation is used in the NUREG-1805 fire model. • The correlation is documented in an authoritative publication of the NFPA Fire Protection Handbook. • The correlation is used within the limits of its range of applicability.
Sprinkler Activation Correlation	Used to estimate sprinkler actuation timing based on ceiling jet temperature, velocity, and thermal response of sprinkler.	• NUREG-1805, Chapter 10, 2004 • NFPA Handbook, 19th Edition, Chapter 3-9, Budnick, E., Evans, D., and Nelson, H., 2003	• The sprinkler actuation correlation is used in the NUREG-1805 fire model. • The correlation is documented in an authoritative publication of the NFPA Fire Protection Handbook. • The correlation is used within the limits of its range of applicability.

Attachment J - Table J-1 - V & V Basis for Fire Models / Model Correlations Used

Calculation	Application	V & V Basis	Discussion
Control Room Abandonment Calculation using CFAST	Evaluates the time at which control room abandonment is necessary based on smoke obscuration and average HGL temperature.	• NIST Special Publication 1086, 2008 • CFAST Version 6 • NUREG-1824, Volume 6, 2007 • NUREG/CR-6850, Appendix H - Damage Criteria, 2005	• V&V of the CFAST code is documented in the NIST Special Publication 1086. • The V&V of CFAST specifically for Nuclear Power Plant applications has also been documented in NUREG-1824. • It was concluded that CFAST models the hot gas layer height, temperature and smoke concentration in an appropriate manner. Furthermore, the predictions of HGL height and temperature are deemed to be within the bounds of experimental uncertainty. • NUREG/CR-6850 generic screening damage criteria is used, which is considered conservative.

Attachment J - Table J-1 - V & V Basis for Fire Models / Model Correlations Used

Calculation	Application	V & V Basis	Discussion
Temperature Sensitive Equipment Hot Gas Layer Study	Determine the upper and lower gas layer temperatures for various compartments, and the layer height, for use in assessing damage to temperature sensitive equipment.	• NIST Special Publication 1086, 2008 • CFAST Version 6 • NUREG-1824, Volume 6, 2007 • NUREG/CR-6850, Appendix H – "Damage Criteria, 2005"	• V&V of the CFAST code is documented in the NIST Special Publication 1086. • The V&V of CFAST specifically for Nuclear Power Plant applications has also been documented in NUREG-1824. • It was concluded that CFAST models the hot gas layer height, temperature and smoke concentration in an appropriate manner. Furthermore, the predictions of HGL height and temperature are deemed to be within the bounds of experimental uncertainty. • NUREG/CR-6850 generic screening damage criteria is used, which is considered conservative.
Temperature Sensitive Equipment Zone of Influence Study	Determine the radiant heat flux ZOI at which temperature sensitive equipment will reach damage thresholds.	• FDS Version 5 • NIST Special Publication 1018-5, Volume 2: "Verification" • NIST Special Publication 1018-5, Volume 3: "Validation" • NUREG-1824, Volume 7, 2007 • NUREG/CR-6850, Appendix H – "Damage Criteria, 2005"	• V&V of the FDS is documented in the NIST Special Publication 1018-5. • The V&V of FDS specifically for Nuclear Power Plant applications has also been documented in NUREG-1824. • It was concluded that FDS models the radiant heat and gas temperature in an appropriate manner. Furthermore, the predictions radiant heat and temperature are deemed to be within the bounds of experimental uncertainty. • NUREG/CR-6850 generic screening damage criteria is used, which is considered conservative.

Attachment J - Table J-1 - V & V Basis for Fire Models / Model Correlations Used

Calculation	Application	V & V Basis	Discussion
Plume/Hot Gas Layer Interaction Study	Determine the point at which hot gas layer and plume interact and establish limits for plume temperature application.	• FDS Version 5 • NIST Special Publication 1018-5, Volume 2: "Verification" • NIST Special Publication 1018-5, Volume 3: "Validation" • NUREG-1824, Volume 7, 2007 • NUREG/CR-6850, Appendix H – "Damage Criteria, 2005"	• V&V of the FDS is documented in NIST Special Publication 1018-5. • The V&V of FDS specifically for Nuclear Power Plant applications has also been documented in NUREG-1824. • It was concluded that FDS models the hot gas layer height, temperature and smoke concentration in an appropriate manner. Furthermore, the predictions of HGL height and temperature are deemed to be within the bounds of experimental uncertainty. • NUREG/CR-6850 generic screening damage criteria is used, which is considered conservative.
Corner and Wall HRR	Determines a heat release rate adjustment factor for fires that are proximate to a wall or corner.	• IMC 0609, Appendix F, 2005 • SFPE Handbook, 4th Edition, Chapter 2-14, Lattimer, 2008	• The correlation is recommended by IMC 0609 for fires near walls and corners. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability.

Attachment J - Table J-1 - V & V Basis for Fire Models / Model Correlations Used

Calculation	Application	V & V Basis	Discussion
Correlation for Heat Release Rates of Cables (Method of Lee)	Used to correlate bench-scale data to heat release rates from cable tray fires.	• NUREG/CR-6850, Appendix R, 2005 • SFPE Handbook, 4th Edition, Chapter 3-1, Babrauskas, 2008	• The correlation is recommended by NUREG/CR-6850. • The correlation is documented in an authoritative publication of the "SFPE Handbook of Fire Protection Engineering." • The correlation is used within the limits of its range of applicability.
Correlation for Flame Spread over Horizontal Cable Trays (FLASH-CAT)	Used to predict the growth and spread of a fire within a vertical stack of horizontal cable trays.	• NUREG/CR-7010, Section 9, 2010 • NUREG/CR-6850, Appendix R, 2005	• The correlation is recommended by NUREG/CR-7010 and follows guidance set forth in NUREG/CR-6850. • The FLASH-CAT model is validated in NUREG/CR-7010, Section 9.2.3, through experimentally measured HRRs compared with the predictions of the FLASH-CAT model. • The correlation is used within the limits of its range of applicability.

Table J-1 References:

1. NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities," U.S. Nuclear Regulatory Commission, Washington, DC, September 2005.

2. NUREG/CR-7010, "Cable Heat Release, Ignition, and Spread in Tray Installations During Fire (CHRISTIFIRE), Volume 1: Horizontal Trays", Draft Report for Comment, United States Nuclear Regulatory Commission, October, 2010.

3. "The SFPE Handbook of Fire Protection Engineering," 4th Edition, P. J. DiNenno, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2008.

4. "The NFPA Fire Protection Handbook," 19th Edition, A. E. Cote, Editor-in-Chief, National Fire Protection Association, Quincy, MA, 2003.

5. Peacock, R.D., Jones, W.W., Reneke, P.A., and Forney, G.P., "CFAST – Consolidated Model of Fire Growth and Smoke Transport (Version 6) User's Guide," NIST Special Publication 1041, National Institute of Standards and Technology, Gaithersburg, MD, December 2005.

6. NIST Special Publication 1086, "CFAST – Consolidated Model of Fire Growth and Smoke Transport (Version 6) Software Development and Model Evaluation Guide", National Institute of Standards and Technology, Gaithersburg, MD, December 2008.

7. NIST Special Publication 1018-5, "Fire Dynamics Simulator (Version 5) Technical Reference Guide, Volume 2: Verification," National Institute of Standards and Technology, October 29, 2010

8. NIST Special Publication 1018-5, "Fire Dynamics Simulator (Version 5) Technical Reference Guide, Volume 3: Validation," National Institute of Standards and Technology, October 29, 2010

9. "Fire Modeling Guide for Nuclear Power Plant Applications," EPRI 1002981, FINAL REPORT, August 2002.

10. IMC 0609, Appendix F, "Fire Protection Significance Determination Process," Issue Date 02/28/05.