NEXTera ENERGY DUANE ARNOLD

March 6, 2013

NG-13-0102
10 CFR 50.90

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Duane Arnold Energy Center
Docket No. 50-331
Renewed Op. License No. DPR-49

Response to Request for Additional Information, License Amendment Request to Adopt National Fire Protection Association Standard 805, Performance-Based Standard For Fire Protection For Light Water Reactor Generating Plants

References:
1) License Amendment Request (TSCR-128): Transition to 10 CFR 50.48(c) - NFPA 805, Performance-Based Standard For Fire Protection For Light Water Reactor Generating Plants (2001 Edition), NG-11-0267, dated August 5, 2011 (ML11221A280)
2) Clarification of Information Contained in License Amendment Request (TSCR-128): Transition to 10 CFR 50.48(c) - NFPA 805, Performance-Based Standard For Fire Protection For Light Water Reactor Generating Plants (2001 Edition), NG-11-0384, dated October 14, 2011
3) Electronic Communication, ME6818 - Duane Arnold Adoption of NFPA-805 – Request for Additional Information – Round 2, dated December 5, 2012 (ML12340A450)
4) Electronic Communication, ME6818 – DAEC NFPA-805 Adoption – Record of Revisions to RAI Items, Expected Response Schedule, Participants List for Meetings on 17-18 December 2012, dated December 19, 2012 (ML12355A072)
5) Response to Request for Additional Information, License Amendment Request to Adopt National Fire Protection Association Standard 805, Performance-Based Standard For Fire Protection For Light Water Reactor Generating Plants, NG-12-0225, dated May 23, 2012

In the Reference 1 letter, as clarified by Reference 2, NextEra Energy Duane Arnold, LLC (hereafter NextEra Energy Duane Arnold) submitted a License

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Amendment Request for the Duane Arnold Energy Center (DAEC) pursuant to 10 CFR 50.90. Subsequently, the NRC Staff requested, via Reference 3, additional information regarding that application.

The Attachment to this letter contains the responses due on March 6, 2013, as documented in Reference 4.

This additional information does not impact the 10 CFR 50.92 evaluation of "No Significant Hazards Consideration" previously provided in the referenced application.

This letter retracts the commitment made in response to RAI SSA 1 in Reference 5. That commitment is replaced with the commitments made in response to RAI SSA 1.01 and RAI FPE 13 of the Attachment to this letter. This letter makes the following new commitments.

RAI Response Number	Description
Probabilistic Risk Assessment 8.01	Table 4-3 of the NextEra Energy Duane Arnold License Amendment Request (ML11221A280) will be updated to include the automatic suppression system required for risk.
Fire Protection Engineering 13	The Insipient Detection System will be installed in accordance with the response to RAI FPE 13.
Safe Shutdown Analysis 1.01	Design and install the incipient detection modification (committed to in Table S-1 of the enclosure to the License Amendment Request (ML11221A280) (LAR)) as described in RAI SSA-1.01.

If you have any questions or require additional information, please contact Tom Byrne at 319-851-7929.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on March 6, 2013

(FOR)

Richard L. Anderson
Vice President, Duane Arnold Energy Center
NextEra Energy Duane Arnold, LLC

Attachment to NG-13-0102

Response to Request for Additional Information, License Amendment Request to Adopt National Fire Protection Association Standard 805, Performance-Based Standard For Fire Protection For Light Water Reactor Generating Plants

29 pages follow

DAEC RAI Fire Protection Engineering 13

In a letter dated May 23, 2012 (ADAMS Accession No. ML12146A094) the licensee responded to Safe Shutdown Analysis RAI 1 regarding incipient detection modification for the MCR, and indicated that because the design was not yet completed that the information was preliminary. Based on this response, the NRC staff requires additional information regarding this new detection system being installed.

The response states, in Item d. that: "The system will be designed and installed in accordance with NFPA 72 and 76." Inspection, testing, and maintenance (IT&M) is necessary to ensure the system reliability and availability assumed in the fire probabilistic risk assessment (FPRA) are maintained. Provide additional detail on the system IT&M that is necessary to maintain the incipient detection system; and the associated PRA assumptions.

The physical separation described in the response to Item b, stated, "...each panel had a substantial metal outer wall." During the audit, it was observed that some panels had "open backs." Clarify how the detection system design criteria is constrained or modified with regard to these "open back" panels.

The Transition Report stated that "the design will be based on FAQ 08-0046 (ADAMS Accession No. ML093220426) and will meet the FAQ guidance such as: sensitivity, equipment voltage restrictions, and fast versus slow acting devices in regard to fire growth." In light of your revised approach to not use FAQ 08-0046, describe how the application of an incipient detection system will be integrated with this revised approach (NUREG 6850 Appendix L, credit for defense in depth only, etc.)

RESPONSE:

- Inspection, testing, and maintenance requirements and procedures will be based on the requirements in NFPA 72, NFPA 76 and vendor recommendations for the specific equipment selected.
- Based on the vendors' input, the open back panels would not reduce the Very Early Warning Fire Detection System (VEWFDS) sensitivity inside the cabinets, but rather would expand the volume where detection would be recognized. An incipient event or a fire could occur inside or outside the volume of space of the instrumented cabinets with screened backs. The VEWFDS would alert or alarm depending on the incipient or damage stage of the event. The alarm response procedures will recognize the need to examine the volume inside and above and

around the cabinets with open backs to identify the cause and source of the event.

- The licensee recognizes that FAQ 08-0046 is not directly applicable to the design of the MCR and is withdrawing the commitment to FAQ 08-0046. In that regard, the Fire PRA has been revised as described in RAI 35.01 to reflect crediting the existing control panel ionization detection system based on NUREG 6850 requirements, specifically Appendix L and Appendix P. In addition to the existing smoke detection system, an incipient fire detection system will be installed as originally identified in Attachment S, Item 2 of the License Application. The incipient detection system will be designed and installed to meet performance based design expectations for VEWFDS requirements in accordance with NFPA 76. Specific design expectations based on the RAI question are answered as follows:
    - The detection sensitivity will be procured and installed to meet an alert threshold of 0.2 percent per foot obscuration and an alarm threshold of 1 percent per foot obscuration sensitivity.
    - An equipment inventory has been completed for the Main Control Room cabinets. The system design and PRA analysis are based on a conservative estimate of less than 10% fast-acting versus slow-acting devices. No equipment has been identified that exceeds the 250 VDC or 480 VAC equipment voltage restrictions.

DAEC RAI PRA 01.01

In your letter dated May 23, 2012 (ADAMS Accession No. ML12146A094) you responded to Probabilistic Risk Assessment (PRA) Request for Additional Information (RAI) 1 and provided information which addressed the correction to the Fire PRA (FPRA) model but additional information is necessary for the staff to complete its review.

a. Verify the new core damage frequency (CDF) and large early release frequency (LERF) results have been reviewed against the applicable American Society of Mechanical Engineers (ASME) PRA Standard supporting requirements for FQ-E1 and the associated Facts and Observations (F&Os) from the 2010 Peer Review. This includes reasonableness reviews identified in the supporting requirements and the F&Os and of the changes to the risk significant scenario results. Updated Tables W-1 and W-2 indicate that the CDF for scenarios 10E F46 and 10E F75 and the LERF for scenarios 10F F12 and 10E F77 have increased compared to the original tables, yet the fire area totals have decreased. Explain why the totals have decreased.

b. Briefly summarize the review process applied to the updated model results to insure that the logic models are valid and no additional erroneous cutsets are included.

c. If the transient heat release rate (HRR) used in the updated results does not comply with NUREG/CR 6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities, April 2005," justify the HRR used using the clarification guidance criteria discussed in Nuclear Energy Institute's (NEIs) letter to NRC dated September 27, 2011 on "Recent Fire PRA Methods Review Panel Decision: Clarification for Transient Fires and Alignment Factor for Pump Oil Fires," (ADAMS Accession No. ML113130448, Non-Publicly Available) and as endorsed by the NRC in its letter to NEI dated June 21, 2012 (ADAMS Accession No. ML12171A583) on "Recent Fire PRA Methods Review Panel Decisions and EPRI 1022993, Evaluation of Peak Heat Release Rates in Electrical Cabinet Fires." Specifically, the justification should address the specific attributes and considerations applicable to the location, plant administrative controls, and the results of a review of records related to violations of the transient combustible controls. If the HRR cannot be justified using the guidance criteria, provide the results of a sensitivity study using the NUREG/CR 6850 HRR in the updated FPRA model and addressing the total CDF and LERF as well as the delta (Δ) CDF and LERF.

d. For Scenario 11A A02 of Table 2 of the RAI response the fire ignition frequency (FIF) is given as 5.70E-07, the conditional large early release probability (CLERP) is given as 1.0, and the LERF is given as 1.71E-07. Provide clarification.

RESPONSE:

a. Section 1.1 of the model update quantification report (0493080001.006) discusses the changes performed to the fire PRA in response to the first set of RAIs. The total

CDF and LERF decrease is associated with the change made to the model logic to prevent the erroneous cutsets (see bullet point 1 in Section 1.1). These cutsets were significant contributors to the fire CDF and LERF presented in the LAR.

The increase in risk of certain scenarios is contributed to the addition of targets based on additional walkdowns performed in response to RAIs associated with fire modeling (see bullet point 6 in Section 1.1).

ASME/ANS RA-Sa-2009 standard SR FQ-E1 requires that significant contributors be identified in accordance with HLR QU-D and HLR LE-F with clarifications for fire PRA. The reviews performed to satisfy these HLRs are as follows:

SR QU-D1 requires a review of a sample of significant accident sequences/cutsets sufficient to determine that the logic of the cutset or sequence is correct. Accident sequence/cutset review was performed for the fire PRA as documented in Section 5.2.2 and 5.2.3 (5.3.2 and 5.3.3 for LERF) of report 0493080001.004 as updated in Section 2.1.1 (Section 2.2.1 for LERF) of report 0493080001.006. Section 1.2 of report 0493080001.006 provides details of the erroneous cutsets that were included in the results presented in 0493080001.004. The cutset reviews described in Sections 2.1.1 and 2.2.1 of 0493080001.006 confirmed the cause was appropriately identified and corrected.

SR QU-D2 requires a review of the results of the PRA for modeling consistency and operational consistency. Section 5 of report 0493080001.004 as updated in Section 2 of report 0493080001.006 document the reviews performed. Each of these reviews was performed to ensure that the model logic was consistent with plant design and operation. Additionally, the PRA was reviewed in detail during the fire risk evaluation (see Section 5.2 and 5.3 of Report Number 0027-0042-000-004 Duane Arnold Energy Center Fire Risk Evaluations) to ensure the model logic was consistent with plant design and operation.

SR QU-D3 requires a review of the results to determine that flag events, mutually exclusive event rules, and recovery rules yield logical results. A review of cutsets was performed for the fire PRA as documented in Section 5.2.3 (5.3.3 for LERF) of report 0493080001.004 as updated in Section 2.1.1 (2.2.1 for LERF) of report 0493080001.006. These reviews determined that flag events, mutually exclusive event rules, and recovery rules yielded logical results.

SR QU-D4 is not applicable to the fire PRA per SR FQ-E1.

SR QU-D5 requires a review of a sample of non-significant cutsets or sequences to determine they are reasonable and have physical meaning. SR FQ-E1 clarifies this SR to include the identification of significant fire scenarios and physical analysis units (PAUs.) A review of the significant fire scenarios and PAUs was performed for the fire PRA as documented in Section 5.2.5 and 5.2.6 (Section 5.3.5 and 5.3.6 for LERF) of report 0493080001.004 as updated in Section 2.1.3 and 2.1.4 (Section

2.2.3 and 2.2.4 for LERF) of report 0493080001.006. These reviews determine the significant fire scenarios and PAUs were reasonable and had physical meaning.

SR QU-D6 requires that significant contributors to CDF be identified. Section 5.5 of report 0493080001.004 identifies significant operator actions and equipment failures with respect to both CDF and LERF. A similar review was not performed for the updated results since the changes were judged to not have a significant impact on the identification of significant operator actions and equipment failures. Significant fire scenarios are identified in Section 5.2.6 (Section 5.3.6 for LERF) of report 0493080001.004 as updated in Section 2.1.4 (Section 2.2.4 for LERF) of report 0493080001.006.

SR QU-D7 requires a review of important components and basic events to determine that they make logical sense. This review was performed for the fire PRA as documented in Section 5.5 of report 0493080001.004. A similar review was not performed for the updated results since the changes were judged to not have a significant impact on the identification of important components and basic events.

SR LE-F1 requires a quantitative evaluation of the contributors to LERF. See discussions above for each HLR QU-D SR.

SR LE-F2 requires a review of contributors for reasonableness. See discussions above for each HLR QU-D SR.

SR LE-F3 is clarified by SR FQ-E1 to include the requirements of HLR QU-D with the clarifications to SR QU-D5a and QU-D5b. See discussion above for SR QU-D5.

b. See the discussion included in part "a" of this response for details. Section 1.2 of report 0493080001.006 provides details of the erroneous cutsets that were included in the results presented in 0493080001.004 and the cutset review in Section 1.2 of 0493080001.006 determined the cause was identified and corrected. The cutset reviews determined that the logic was correct.

c. An update of the transient HRR sensitivity provided in the LAR was performed. Transient fire scenarios contribute 1.5% to the total CDF and 1.8% to the total LERF. Based on the updated sensitivity study, the use of the larger NUREG/CR-6850 transient HRR would increase CDF by 0.5% and LERF by 1.2%. Given these small increases, the total plant risk is estimated to still meet the acceptance guidelines of RG 1.174.

   Transient scenarios are included in several of the VFDR conditions evaluated in the NFPA 805 application Fire Risk Evaluation (FRE) process. The only transient scenarios identified to change the risk evaluated in the FREs when subject to a larger HRR are those postulated in area RB3. The total risk for area RB3 could increase 5% for CDF and LERF given a larger HRR. The increase in risk for area RB3 would not change the conclusions of the LAR for area RB3 total risk. The delta risk for area RB3 is estimated to be the same or less (i.e., estimates resulted in a decrease in delta risk because the risk for the variant and compliant case

increased). Therefore, the RB3 risk and delta risk is estimated to still meet the acceptance guidelines of RG 1.174.

d. In response to RAI PRA 14.01 and RAI PRA 20.01, a Cable Spreading Room (CSR) Fire Scenario and Quantification Report (0493080001.007) was prepared. The updated results for the CSR are presented in RAI PRA 14.01.

DAEC RAI PRA 8.01

a. In your letter dated May 23, 2012 (ADAMS Accession No. ML12146A094) you responded to PRA RAI 08 and stated that since all MCA results are less than 1E-07 they screen out and including them in the total and delta CDF and LERF is not appropriate. As stated in the fire scenario report (FSR) Appendix C, the MCA methodology "differs slightly from the guidance in NUREG/CR-6850, Section 11.5.4 but meets the intent of the requirements."

The staff review of the methodology noted one difference from the NUREG/CR-6850 guidance involving your steps 9, 10 and 11 compared with 6850's Step 5.c (Section 11.5.4.5, p. 11-46). The latter requires that: "...failure of all fire PRA components and cables present in the combination of exposing and exposed compartments should be estimated." If not screened out with the above assumption, the next step is the detailed analysis whose results are to be included in the total CDF and LERF.

Provide a sensitivity study that follows the accepted guidance, i.e., where the final step of the screening analysis is in accordance with the guidance of NUREG/CR-6850 for all areas, such as that for PAUs 02E and 02B, where the final screening step did not include a conservative CCDP assuming all targets in the two PAUs failed. The sensitivity study results should include the resulting scenarios in the FPRA and all the total/delta CDF and LERF evaluations.

b. The MCA analysis uses a CDF of <1E-07 for screening purposes. ASME PRA standard SR QNS-C1 for CC II requires (as clarified by RG 1.200) that it be verified that:

i. the quantitative screening process does not screen the highest risk fire areas and

ii. the sum of the CDF contributions for all screened fire compartments is < 10% of the estimated total CDF for fire events and

iii. the sum of the LERF contributions for all screened fire compartments is < 10% of the estimated total LERF for fire events.

Describe how the results of the corrected FPRA model compare to the ASME PRA standard SR QNS-C1 for CC II, as clarified by RG 1.200. If greater than or equal to the SR QNS-C1 criteria, provide the sum of all screened CDF and LERF contributions.

RESPONSE:

a. In response to this RAI and RAI PRA 72, the MCA was reevaluated using the accepted guidance of NUREG/CR-6850. The updated MCA resulted in twenty

scenarios that were further evaluated and included in the quantification results. Table 1 presents the MCA scenarios CDF and Table 2 presents the LERF.

In updating the MCA to the accepted guidance, the automatic suppression system in PAU 03D was credited for risk when previously not. The subject automatic suppression system was previously required in the LAR for defense-in-depth. However, Table 4-3 of the LAR will be updated to include the automatic suppression system required for risk, as well.

b. NUREG/CR-6850 provides guidance in Section 11.5.4.5 Step 5.c for CDF screening. The updated MCA uses a CDF of 5E-8/yr for screening. This resulted in 720 MCA scenarios being screened with a total screening CDF of 1.15E-6/yr.

   The fire PRA did not screen PAUs using ASME PRA standard technical element QNS. However, the fire PRA did use the QNS screening criteria as guidance in performing the MCA. The screening process employed for this updated MCA conforms to SR QNS-C1 Cat II of the ASME PRA standard. Use of a low screening CDF criterion of 5E-8/yr ensures that all "highest risk" PAU combinations are retained for further analysis. The updated MCA resulted in the scenarios being screened having a total screening CDF less than ten percent of the total estimated plant fire CDF.

   Additionally, while screening on LERF is not a step of the NUREG/CR-6850 guidance for MCA, the total screening CDF of 1.15E-6/yr is expected to result in the total screened LERF to be less than ten percent of the total plant estimated fire LERF.

Table 1

MCA Scenarios CDF

Designator	Scenario	Description	FIF (/yr)	NSP	SF	CCDP	CDF (/yr)
02E02B	A	MCA scenario from PAU 02E to PAU 02B	2.87E-03	1.00E+00	1.72E-02	8.59E-05	4.24E-09
07A07H	A	MCA scenario from PAU 07A to PAU 07H	2.65E-04	5.00E-02	1.00E+00	6.83E-03	9.04E-08
07A08A	A	MCA scenario from PAU 07A to PAU 08A	2.65E-04	5.00E-02	1.00E+00	1.91E-02	2.53E-07
07E07C	A	MCA scenario from PAU 07E to PAU 07C	1.59E-05	1.00E+00	1.00E+00	5.61E-03	8.92E-08
07E07F	A	MCA scenario from PAU 07E to PAU 07F	1.59E-05	1.00E+00	2.00E-01	3.64E-03	1.16E-08
07E08C	A	MCA scenario from PAU 07E to PAU 08C	1.59E-05	1.00E+00	1.00E+00	3.75E-03	5.96E-08
07E08D	A	MCA scenario from PAU 07E to PAU 08D	1.59E-05	1.00E+00	1.00E+00	3.75E-03	5.96E-08
07E08G	A	MCA scenario from PAU 07E to PAU 08G	1.59E-05	1.00E+00	2.00E-01	3.64E-03	1.16E-08
07E08H	A	MCA scenario from PAU 07E to PAU 08H	1.59E-05	1.00E+00	2.00E-01	3.64E-03	1.16E-08

Table 1

MCA Scenarios CDF

Designator	Scenario	Description	FIF (/yr)	NSP	SF	CCDP	CDF (/yr)
07E08J	A	MCA scenario from PAU 07E to PAU 08J	1.59E-05	1.00E+00	2.00E-01	3.64E-03	1.16E-08
08F08D	A	MCA scenario from PAU 08F to PAU 08D	5.95E-03	5.00E-02	9.80E-03	1.78E-04	5.19E-10
08F08G	A	MCA scenario from PAU 08F to PAU 08G	5.95E-03	5.00E-02	9.80E-03	1.31E-04	3.81E-10
08H08D	A	MCA scenario from PAU 08H to PAU 08D	5.95E-03	5.00E-02	9.80E-03	3.75E-03	1.09E-08
16A16B	A	MCA scenario from PAU 16A to PAU 16B	2.42E-05	1.00E+00	1.25E-02	1.36E-03	4.11E-10
16A16F	A	MCA scenario from PAU 16A to PAU 16F	2.42E-05	1.00E+00	3.00E-01	1.36E-03	9.85E-09
16B16A	A	MCA scenario from PAU 16B to PAU 16A	2.42E-05	1.00E+00	1.25E-02	1.36E-03	4.11E-10
16B16F	A	MCA scenario from PAU 16B to PAU 16F	2.42E-05	1.00E+00	5.10E-03	1.36E-03	1.67E-10
17A17B	A	MCA scenario from PAU 17A to PAU 17B	8.76E-04	1.00E+00	9.80E-03	1.20E-03	1.03E-08
17B17A	A	MCA scenario from PAU 17B to	8.76E-04	1.00E+00	9.80E-03	1.20E-03	1.03E-08

Table 1

MCA Scenarios CDF

Designator	Scenario	Description	FIF (/yr)	NSP	SF	CCDP	CDF (/yr)
		PAU 17A					
17B17C	A	MCA scenario from PAU 17B to PAU 17C	8.76E-04	1.00E+00	2.46E-02	1.20E-03	2.59E-08
Total							6.72E-07

Table 2

MCA Scenarios LERF

Designator	Scenario	Description	FIF (/yr)	NSP	SF	CLERP	LERF (/yr)
02E02B	A	MCA scenario from PAU 02E to PAU 02B	2.87E-03	1.00E+00	1.72E-02	2.61E-05	1.29E-09
07A07H	A	MCA scenario from PAU 07A to PAU 07H	2.65E-04	5.00E-02	1.00E+00	1.59E-03	2.11E-08
07A08A	A	MCA scenario from PAU 07A to PAU 08A	2.65E-04	5.00E-02	1.00E+00	1.58E-02	2.09E-07
07E07C	A	MCA scenario from PAU 07E to PAU 07C	1.59E-05	1.00E+00	1.00E+00	1.25E-03	1.99E-08
07E07F	A	MCA scenario from PAU 07E to PAU 07F	1.59E-05	1.00E+00	2.00E-01	8.17E-04	2.60E-09
07E08C	A	MCA scenario from PAU 07E to PAU 08C	1.59E-05	1.00E+00	1.00E+00	9.17E-04	1.46E-08
07E08D	A	MCA scenario from PAU 07E to PAU 08D	1.59E-05	1.00E+00	1.00E+00	9.17E-04	1.46E-08
07E08G	A	MCA scenario from PAU 07E to PAU 08G	1.59E-05	1.00E+00	2.00E-01	8.17E-04	2.60E-09
07E08H	A	MCA scenario from PAU 07E to	1.59E-05	1.00E+00	2.00E-01	8.17E-04	2.60E-09

Table 2

MCA Scenarios LERF

Designator	Scenario	Description	FIF (/yr)	NSP	SF	CLERP	LERF (/yr)
		PAU 08H					
07E08J	A	MCA scenario from PAU 07E to PAU 08J	1.59E-05	1.00E+00	2.00E-01	8.17E-04	2.60E-09
08F08D	A	MCA scenario from PAU 08F to PAU 08D	5.95E-03	5.00E-02	9.80E-03	4.68E-05	1.36E-10
08F08G	A	MCA scenario from PAU 08F to PAU 08G	5.95E-03	5.00E-02	9.80E-03	2.92E-05	8.50E-11
08H08D	A	MCA scenario from PAU 08H to PAU 08D	5.95E-03	5.00E-02	9.80E-03	9.01E-04	2.62E-09
16A16B	A	MCA scenario from PAU 16A to PAU 16B	2.42E-05	1.00E+00	1.25E-02	3.14E-04	9.49E-11
16A16F	A	MCA scenario from PAU 16A to PAU 16F	2.42E-05	1.00E+00	3.00E-01	3.14E-04	2.28E-09
16B16A	A	MCA scenario from PAU 16B to PAU 16A	2.42E-05	1.00E+00	1.25E-02	3.14E-04	9.49E-11
16B16F	A	MCA scenario from PAU 16B to PAU 16F	2.42E-05	1.00E+00	5.10E-03	3.14E-04	3.87E-11
17A17B	A	MCA scenario from PAU 17A to PAU 17B	8.76E-04	1.00E+00	9.80E-03	2.67E-04	2.29E-09

Table 2

MCA Scenarios LERF

Designator	Scenario	Description	FIF (/yr)	NSP	SF	CLERP	LERF (/yr)
17B17A	A	MCA scenario from PAU 17B to PAU 17A	8.76E-04	1.00E+00	9.80E-03	2.67E-04	2.29E-09
17B17C	A	MCA scenario from PAU 17B to PAU 17C	8.76E-04	1.00E+00	2.46E-02	2.67E-04	5.75E-09
Total							3.06E-07

DAEC RAI PRA 11.01

a. In your letter dated April 23, 2012, (ADAMS Accession No. ML12117A052) you responded to PRA RAI 11 citing Table O-2 of NUREG/CR-6850 where you referred to the values 5E-4 and 1E-5 as conditional catastrophic, non-suppressed fire probabilities. You then used these values to support your conditional estimates. In fact, these values are catastrophic, non-suppressed fire frequencies as denoted by their units of per year.

The fire ignition frequency for each of these values is the sum of turbine generator ignition frequencies from frequency bins 33, 34, and 35. Besides the ignition frequency, 5E-4/yr also includes the conditional probability of catastrophic damage, 0.025. 1E-5/yr further includes the failure of fixed suppression preventing catastrophic damage with a probability of 0.02.

I. To estimate your conditional catastrophic, non-suppressed fire probabilities, you take additional credit for manual suppression from the turbine generator (TG) manual suppression curves. These curves do not reflect the severity of the catastrophic TG fire scenario. For a catastrophic TG fire, the scenario that should be evaluated is rupture of the turbine generator, and the postulated damage is identified in Table O-2. The table cites widespread damage from several types of fires. For the oil fire scenario in particular, it should be postulated that hundreds of gallons of oil could be released immediately upon turbine generator rupture.

Discuss your evaluation leading to your conditional catastrophic, non-suppressed fires. Should you desire to apply credit associated with a catastrophic turbine generator fire beyond that quantified in NUREG/CR-6850, provide your basis as related to fires of such severity. Discuss this extra credit also in light of plant specific training and conditions, as appropriate. Tie these discussions directly to the quantification. Provide the CDF, LERF, and delta CDF, delta LERF for this scenario.

II. In addition to an oil fire itself causing widespread damage within the building, turbine building failure due to loss of structural integrity is not addressed in your RAI response. For assessing manual suppression with regard to preventing failure of the turbine building itself, scenarios from damage to the building structural integrity is governed by the ASME/ANS PRA Standard RA-Sa-2009, part 4, FSS-F requirement, and are important for areas of exposed structural steel in the location of a high hazard fire source.

Please summarize your evaluation and how it compares to the FSS-F requirement.

(Note: Based on the screening approach in NUREG/CR-6850, a bounding frequency for this scenario, which includes detection and suppression credit, is 1E-5/yr.

Combined with an estimated CCDP value based on the considerations in Part II, this suggests a bounding frequency for this scenario of 1E-5/yr x CCDP.)

b. In your letter dated April 23, 2012, (ADAMS Accession No. ML12117A052) you responded to PRA RAI 11 and discussed fire scenario TBO01. The FSR, Rev. 4 discusses a revised catastrophic TG oil fire, identified as fire scenario TBO01. Appendix A of the FSR identifies it as TB1 O01. The updated quantification report does not appear to include the CDF or LERF for this scenario. Please explain this discrepancy and provide updated results as necessary.

RESPONSE:

a. I. The catastrophic TG fire scenario was updated consistent with the clarifications provided in this RAI. The DAEC Bayesian updated frequencies for NUREG/CR-6850 bins 33, 34, and 35 are 3.66E-3/yr, 5.91E-3/yr, and 8.37E-3/yr, respectively. Therefore, the fire ignition frequency for the postulated DAEC catastrophic TG fire is 1.794E-2/yr (3.66E-3 + 5.91E-3 + 8.37E-3 = 1.794E-2/yr). Consistent with the RAI, the conditional probability included is 0.025 and the automatic non-suppression probability applied is 0.02. The updated scenario does not include credit for manual suppression. From the updated quantification report, 0493080001.006, the CCDP was calculated to be 1.95E-2 (see Table D-1 entry for PAU TB1 scenario O01). The CLERP was calculated to be 1.59E-2 (see Table E-1 entry for PAU TB1 scenario O01).

Based on the above inputs, the TG catastrophic fire CDF and LERF are calculated as follows:

CDF = 1.794E-2 * 0.025 * 0.02 * 1.95E-2 = 1.75E-7/yr

LERF = 1.794E-2 * 0.025 * 0.02 * 1.59E-2 = 1.43E-7/yr

The proposed modification for the Division 2 Emergency Service Water Pump resolves the VFDR associated with Turbine Building fire scenarios. Therefore, there is not a delta risk calculation associated with the catastrophic TG fire scenario.

II. The catastrophic TG fire scenario satisfies each of the HLR FSS-F SRs as follows:

- SR FSS-F1 requires that locations be identified that include exposed structural steel and a high hazard source. The Turbine building was identified as the location with exposed structural steel and contained a high hazard source based on the guidance in NUREG/CR-6850 Appendix O.
- SR FSS-F2 requires that if, per SR FSS-F1, one or more scenarios are selected, the criteria for structural collapse shall be established and

justified. The catastrophic TG scenario was selected and the criteria for structural collapse were based on the guidance in NUREG/CR-6850 Appendix O.

- SR FSS-F3 requires that if, per SR FSS-F1, one or more scenarios are selected, a quantitative assessment of the risk shall be completed in a manner consistent with the FQ requirements, including collapse of the exposed structural steel. The catastrophic TG fire scenario was included in the quantification and included failure of all equipment and cables located in the Turbine Building.

b. The discrepancy is the result of a typographical error in the FSR. The catastrophic TG fire scenario identifier is TB1 O01. Table D-1 and E-1 of the updated quantification report included the CDF and LERF for the scenario as the last entry in each table (see entry for PAU TB1 scenario O01). The results in those tables are superseded by the results presented in this RAI response.

DAEC RAI PRA 35.01

In your letter dated May 23, 2012, (ADAMS Accession No. ML12146A094) you responded to PRA RAI 35 and provided a sensitivity study using the FAQ 08-0046 (ADAMS Accession No. ML093220426) event tree even though this FAQ is not intended to be applied in the main control room (MCR). Given that a FAQ has not yet been established for incipient detection in the MCR and a basis for credit has not been established, provide the LAR results (CDF, LERF, ΔCDF, and ΔLERF) without crediting incipient detection in the MCR.

RESPONSE:

In response to this RAI, the MCR analysis was reevaluated, independent of FAQ 08-0046, using the accepted guidance of NUREG/CR-6850 for MCR fires. Credit for proposed incipient detection in the MCR has been included in the model using insight provided in the accepted guidance of NUREG/CR-6850.

The current treatment of postulated fires in the Main Control Board (MCB) is described in NUREG/CR-6850, Appendix L. Although the guidance in this appendix is applicable only to the MCB, it provides key insights as to the treatment of fire detection and suppression. A key insight from this guidance is that the conditional probability that a fire at any location within the MCB results in damage beyond the ignition source is less than approximately 6E-3. This value is approximated from NUREG/CR-6850 Figure L-1 using d = 0 m for thermoset cables. As described in NUREG/CR-6850 Appendix L, this value would be multiplied by the MCB fire frequency to obtain the frequency of the specific event. The discussion in NUREG/CR-6850 Appendix L and the development of the analysis used to generate the results shown in NUREG/CR-6850 Figure L-1 shows that credit for manual suppression using the λ term of 0.33 from Appendix P is included.

In Section P.1.3, the following two items are noted:

If in-cabinet smoke detection devices are installed in the electrical cabinet postulated as the ignition source, the analyst should assume that the fire will be detected in its incipient stage. This incipient stage is assumed to have a duration of 5 minutes.

Prompt detection should be only credited when ... a high-sensitivity smoke detection system is installed. ...

The following treatments can therefore be considered to be within the existing methodology of NUREG/CR-6850.

- If an in-cabinet smoke detector is available in the MCB, then the NUREG/CR-6850 Appendix L treatment can be modified to provide an additional 5 minutes for fire suppression.
- If an in-cabinet smoke detector is available in an electrical cabinet (panel), then successful suppression at 5 minutes would be equivalent to no damage beyond the incipient source within the cabinet.

The treatment framework already described in NUREG/CR-6850 is used to establish an 'anchor' point as part of the process of developing recommendations for the crediting of

an aspirating smoke detector (ASD) installed as a very early warning fire detector (VEWFD) as defined by NFPA 76 for applications.

The credit available for the presence of in-cabinet smoke detectors is described in NUREG/CR-6850. Two cases are applicable to the DAEC Fire PRA:

1. MCB panel in the MCR
2. Non-MCB panel in the MCR

$$\textit{From Appendix L}:$$

$$[SF \bullet P_{ns}](d) = \frac{1}{H \bullet W} \int_0^H \int_0^W SF(d,w,h) \bullet P_{ns}(d,w,h) dw dh$$

$$P_{ns}(d,w,h) = e^{-\lambda \bullet t}$$

With a traditional non-aspirating (e.g., ionization) smoke detector installed inside the MCB, the suppression term $e^{-\lambda t}$ would become $e^{-\lambda(t+5)}$. The ratio of these two factors can then be applied to the original equation from NUREG/CR-6850 Appendix L. The net result is that a constant factor is added as shown below.

$$[SF \bullet P_{ns}](d) = \frac{1}{H \bullet W} \int_0^H \int_0^W SF(d,w,h) \bullet P_{ns}(d,w,h) dw dh \bullet \frac{e^{-\lambda \bullet (t+5)}}{e^{-\lambda \bullet t}}$$

$$[SF \bullet P_{ns}](d) = e^{-\lambda \bullet 5} \bullet \frac{1}{H \bullet W} \int_0^H \int_0^W SF(d,w,h) \bullet P_{ns}(d,w,h) dw dh$$

$$\lambda = 0.33, \textit{ and therefore, } e^{-\lambda \bullet 5} = 0.19$$

This development shows that for the traditional non-aspirating smoke detector installed in the MCB, application of the existing guidance in NUREG/CR-6850 would result in the factors taken from NUREG/CR-6850 Appendix L, Figure L-1, being reduced by a factor of 0.19. Including hardware failure would result in this value being increased to 0.24 (0.19 + .05). If instead, an ASD installed as a VEWFD were to be used instead, the associated reduction factor should be lower than 0.24. The lower value would be based on the additional time associated with the advance warning that would be appropriate given the presence of an ASD system. It is evident that prior to open flaming, enough smoke would be generated that it would be recognized by the MCR staff. In order to eliminate concerns related to dependencies between the detection mechanisms while still providing for a reasonable credit for the ASD system, a value less than 60 minutes should be used. As an example, the advance warning time could be increased from 5 minutes to 10 minutes (ASD system provides an additional 5 minutes of advance warning). A screening hardware failure probability of 0.01 is included.

$$e^{-\lambda(10)} + 0.01 = e^{-0.33(10)} + 0.01 \sim 0.05$$

It is recognized that the result of this treatment is sensitive to the time duration assumed. The results of a sensitivity study as the value of this additional delay varies.

Continuously Occupied Location	
ASD Detection Credit (min.) [1]	Appendix L Adjustment Factor
0	0.20
5	0.05
10	0.02
15	0.01
20	0.01
25	0.01
30	0.01

Note 1: The time duration refers to the additional time warning provided by the ASD system as compared to a traditional non-aspirating smoke detector

In order to credit the advantages and benefits of an ASD system while maintaining a degree of conservatism pending further research, a factor of 0.02 is used. This is based on the ASD system providing an additional 10 minutes of advance warning over that which would be provided by a non-aspirating smoke detector installed in the MCB. As noted above, this value should be applied together with the parameters from Figure L-1 of NUREG/CR-6850.

The extent of internal fire damage within the MCB should be treated using the existing guidance in Appendix L of NUREG/CR-6850.

With respect to Non-MCB Panels in the Main Control Room, the current guidance in NUREG/CR-6850 recommends that a fire PRA treat the presence of an in-cabinet smoke detector by considering the availability of an alarm before it would have otherwise been detected by other means. The guidance states that this advance warning would occur during an assumed five minutes incipient period. As discussed in the previous section, if an ASD installed as VEWFD were to be used instead, additional advance warning would be available. The previous treatment provides a sensitivity study for the fire suppression failure as a function of the ability to detect the fire in the incipient phase. The recommended treatment for the MCB assumes that an additional 10 minutes of time would be available. For the non-MCB panels, additional time could be available.

The treatment for the MCB limited the additional advance warning to 10 minutes. This limited credit is intended to address the potential overlap of detection by the ASD system and detection by the MCR staff by smell. For the non-MCB panels, additional time would be available if the panel is not located in the same general proximity to the MCR staff as the MCB. A review of the sensitivity study in the prior section shows that if an additional 5 minutes of available time (15 minutes of additional time) the resultant non-suppression factor would be 0.01. However, a factor of 0.02 is used in the DAEC Fire PRA.

In summary, the MCR analysis credits the currently-installed cabinet detection with a non-suppression probability of 0.24. For the cabinets in which incipient detection will be installed the MCR analysis credits this detection instead of using a non-suppression probability of 0.02. As asked in this RAI, the results of a sensitivity study are presented in which incipient detection is not credited. In this case each cabinet has a non-suppression probability of 0.24 based on the currently-installed cabinet detection.

Table 1 presents a comparison of the results for the MCR analysis. The results of three models are presented:

- Base MCR Analysis with Incipient Detection Credit – results based on the MCR evaluation crediting incipient detection as discussed in the responses to RAI PRA 01 and PRA 35 with further details provide in the quantification report 049308001.006, May 2012.
- Updated MCR Analysis with Incipient Detection Credit – applies the methodology presented in this RAI response for incipient detection credit.
- Updated MCR Analysis without Incipient Detection Credit – sensitivity study that removes credit for incipient detection.

Table 2 presents the delta risk results for the MCR and Fire Area CB1 for the three models.

Table 1
Comparison of MCR and Fire Area CB1 Fire Risk

Model	MCR		CB1	
	CDF	LERF	CDF	LERF
Base MCR Analysis with Incipient Detection Credit (1)	7.71E-7	2.31E-7	1.37E-6	4.30E-7
Updated MCR Analysis with Incipient Detection Credit (2)	5.65E-7	8.01E-8	1.86E-6 (4)	4.77E-7 (4)
Updated MCR Analysis without Incipient Detection Credit (3)	5.80E-6	2.97E-7	7.09E-6 (4)	6.93E-7 (4)

Notes to Table 1:

1. Based on the results presented in the updated quantification report 0493080001.006, May 2012.
2. Based on an updated model applying an incipient detection modification credit of 0.02 as discussed in this RAI response.
3. Based on applying no credit for incipient detection and credits only the currently installed detection system.
4. Includes updated results for the Cable Spreading Room evaluation as documented in 0493080001.007

Table 2
Comparison of MCR and Fire Area CB1 Delta Risk

Model	MCR		CB1	
	CDF	LERF	CDF	LERF
Base MCR Analysis with Incipient Detection Credit (1)	1.49E-8	1.49E-8	1.49E-8	1.49E-8
Updated MCR Analysis with Incipient Detection Credit (2)	2.91E-9	2.91E-9	3.43E-9 (4)	3.30E-9 (4)
Updated MCR Analysis without Incipient Detection Credit (3)	3.49E-8	3.49E-8	3.54E-8 (4)	3.53E-8 (4)

Notes to Table 2:

1. Based on the results presented in the updated quantification report 0493080001.006, May 2012.
2. Based on an updated model applying an incipient detection modification credit of 0.02 as discussed in this RAI response.
3. Based on applying no credit for incipient detection and credits only the currently installed detection system.
4. Includes updated results for the Cable Spreading Room evaluation as documented in 0493080001.007

DAEC RAI PRA 66

Since the plant modifications in Attachment S of the LAR have not been completed but have been credited directly or indirectly in the change-in-risk estimates provided in Attachment W, the models and values used in the PRA are necessarily estimates based on current plans. The as-built facility after the modification is completed may be different than the plans. Add an implementation item that, upon completion of all PRA credited modifications, verifies the validity of the reported change-in-risk. This item should include your plan of action should the as-built change-in-risk exceed the estimates reported in the LAR.

RESPONSE:

Two proposed modifications are listed in Table S-1 of the LAR. One is to modify the Emergency Service Water Pump "B" motor control circuitry to ensure the pump can be operated from the main control room for a fire in Fire Area TB1. This modification will correct the associated variance and result in a deterministically compliant condition. Since the variance will be corrected, there will no longer be a change-in-risk associated with it. The other modification is to install incipient detection in certain main control room panels. Consideration of incipient detection in the evaluation of change-in-risk for control room abandonment scenarios is being addressed in our response to RAI SSA 1.01, RAI FPE 13 and RAI PRA 35.01.

As stated in the response to RAI PRA 58.01, a full update of the NFPA 805 Fire PRA has not been performed but will be performed prior to transition. An action item to track completion of this activity has been entered into the NextEra Energy corrective action program database.

DAEC RAI PRA 69

Section 5.1.4 of the FSR, discusses treatment of electronics. From the discussion, it appears that it was assumed that since electronics are always in cabinets, protection provided by cabinets offsets the non-conservatism of using the cable damage criteria rather than a lower damage criteria for electronics based ZOI in the generic fire modeling report. Provide a revised analysis using the lower damage criteria for electronics or provide a demonstration that the use of the cable damage criteria is not non-conservative.

RESPONSE:

The Main Control Room is the location known to have electronics. Section 5.2 of the FSR discusses the Main Control Room analysis. Main Control Board fires were evaluated using NUREG/CR-6850. That is, the probability of damage to components in the Main Control Board is based on the distance between the components. The control panels in the Main Control Room behind the Main Control Board are evaluated similar to other NUREG/CR-6850 bin 15 panels. The DAEC abandonment time report (report 1EAK27056.001) provides the results used to identify the times to meet the abandonment criteria. Based on this report, control panel fires exceed the smoke layer visibility criterion before the NUREG/CR-6850 electronics temperature threshold (65°C) is exceeded. Therefore, the fire PRA assumes abandonment prior to damage to electronics. Given the fire PRA treatment, electronics in the Main Control Room have been adequately addressed per NUREG/CR-6850.

DAEC RAI PRA 72

In your letter dated April 23, 2012, (ADAMS Accession No. ML12117A052) you responded to PRA RAI 55 and stated:

"After 60 minutes, the fire is assumed to be "out"."

There are non-suppression probabilities in NUREG/CR-6850 Table P-3 that extend beyond 60 minutes and the Table indicates that a minimum non-suppression probability of 1E-3 should be used. Clarify if non-suppression probabilities of less than 1E-3 were used (i.e., no fire damage possible after 60 minutes). If non-suppression probabilities of less than 1E-3 were used, provide justification for using a lower value and also perform a sensitivity study using the NRC accepted minimum value of 1E-3 and provide the resulting changes to the change in risk estimates.

RESPONSE:

There were two instances in which non-suppression probabilities less than the NRC accepted minimum value of 1E-3 were used:

The MCR abandonment probability calculation resulted in non-suppression probabilities less than 1E-3 based on the time to reach abandonment conditions. In response to this RAI, the MCR abandonment probability calculation was updated to apply the minimum non-suppression probability of 1E-3. In response to RAI PRA 35.01, the MCR analysis was reevaluated and the new results are presented in that RAI response.

The MCA did not consider the potential for hot gas layer formation after 60 minutes. In response to this RAI, the MCA was updated to apply the minimum non-suppression probability of 1E-3 in scenarios where the potential for hot gas layer formation after 60 minutes exists. Use of this non-suppression probability did not change the results of the MCA. That is, MCA scenarios with a 1E-3 non-suppression probability were screened. In response to RAI PRA 08.01, the MCA was reevaluated and the new results are presented in that RAI response.

DAEC RAI PRA 76

It is noted that a fire in a PAU may result in an increase in the general environmental temperature in the area beyond that for which the equipment in the area is environmentally qualified. This may then lead to failures of this equipment, particularly for those requiring active room cooling, even if the item (and its normal room cooling) is outside of the ZOI for the fire. Describe whether this has been considered in the NFPA 805 analysis and if not, why not.

RESPONSE:

The guidance in NUREG/CR-6850 Appendix H was applied when considering damage criteria for targets. Section H.1 discusses damage criteria for cables. Section H.2 discusses damage criteria for other equipment. Per Section H.2, the fire vulnerability for major components was assumed to be limited by the vulnerability of the power, control, and/or instrument cables supporting the component. Therefore, equipment failure was evaluated based on the cable damage criteria. Section 2.3 of the Fire Scenario Report (0493080001.003) discusses the damage criteria used. The fire PRA considered the effects of increased ambient temperatures in the context of hot gas layer effects and its influence on the calculated zone of influence of the fire event.

NUREG/CR-6850 Section H.2 does provide guidance for damage criteria for electronics that is lower than that of cables. Treatment of electronics is discussed in the response to RAI 69.

Temperatures for which equipment is environmentally qualified are based on operability for long durations. Equipment can typically withstand increased temperatures for shorter durations (see DAEC Corrective Action Item CE004229). The referenced Corrective Action Item examined the effect of acute temperature excursions well above normal ambient temperature and did not identify any specific concerns.

In consideration of temperature rise in adjacent rooms, Section 2.2.2 of the DAEC MCR abandonment time report (report 1EAK27056.001) discusses thermal penetration time. Based on the report, no significant heat up of adjacent rooms across concrete walls would occur for several hours. In the absence of barriers, the multi-compartment analysis evaluates the risk of the loss of all equipment in the exposing and exposed PAUs. Therefore, temperature rise in adjacent rooms is not expected to be a significant contributor to plant risk.

DAEC RAI SSA 1.01

In a letter dated May 23, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12146A094) the licensee responded to Safe Shutdown Analysis RAI 1. In that response regarding incipient detection (also called Very Early Warning Fire Detection Systems (VEWFDS)), for the main control room (MCR), the licensee indicated that because the design was not yet completed that the information was preliminary. Based on this response, the NRC staff requires additional information regarding this new detection system being installed.

Because the system is expected to have common air piping, the licensee stated that there would be separate means to diagnose the specific faulting or failing cabinet and that this diagnosis would be performed by the responders using local supplemental incipient detection equipment guided by operating procedures. There is insufficient information in the response to understand what sequence of alarm detection, panel identification, and plant response mitigation will be employed.

a. Describe how will the response to control room fires change as a result of the installation of a VEWFDS.

b. Describe how response times will be modified based on the design.

c. Provide a detailed description of the proposed procedural response to a VEWFDS alert/alarm in a main control board section.

RESPONSE:

a. Fire response in the Control Room depends on the severity and timing in regard to the onset of a fire or pre-fire event. With the current detection system, essentially a EWFDS under NFPA 76 terminology, a fire would be expected to cause damage and likely loss of panel function(s) at the time the event is discovered and would potentially result in Control Room abandonment based on current plant procedures. With the addition of a VEWFDS, the event response would be expected to start when an early warning alert is indicated by the VEWFDS. This early warning alert would provide time to locate, assess and mitigate component damage and mitigate loss of panel function.

   As described in response to RAI SSA 1 in letter NG-12-0225, date May 23, 2012,

   "Alarm Response Procedures will be developed to guide the Operator response to both alert and alarm events. The procedures will provide guidance on a cabinet by cabinet basis as to what actions are recommended in regard to diagnosing the cause of an alert/alarm, providing recommended compensatory measures and identification of support resources. The Alarm Response Procedures will be designed to work in conjunction with existing operating procedures, abnormal operating and emergency response procedures."

b. Considering the guidance in EPRI 106735 and vendor technical information incipient detection at the "alert" level would be expected to "evolve over a period of tens of minutes to more typically hours, days or longer," prior to the onset of significant flame or heat and prior to actual component damage and loss of panel function. Consequently, early event response time will be spent:

   1. identifying the location and source of the alert, and

   2. putting in place compensatory actions to potentially reduce/mitigate the consequences of failures within a panel with the objective of limiting damage to the component or nearby components.

   Thereby eliminating the need to abandon the Control Room for such events.

c. The response to

   1. an "Alert" would be to:

      1. Identify the affected panel. Depending on the vendor equipment selected this may be indicated or may require the use of portable monitoring equipment and procedures as recommended by the vendor.

      2. Initiate a Fire Patrol in the Control Room to monitor the panel that has shown an alert and be prepared to extinguish any flame.

      3. Initiate the Fire Brigade if appropriate.

      4. Utilize pre-developed panel by panel troubleshooting guidance to assess and identify mitigation strategies to remove power or isolate specific components. Request technical support to assist in analyzing and assessing the condition of a panel as needed. The assessment would include portable equipment to sniff for combustibles or an infrared gun to identify hot components or wires.

      5. Mitigate the situation either by removing power, isolating equipment and/or extinguishing any flame with a portable fire extinguisher.

   2. If the event develops to a situation where an "Alarm" comes in:

      1. Re-assess and/or identify that the alarm is for the previously identified panel and/or a different panel.

      2. Initiate the Fire Brigade and station a Fire Patrol to either extinguish the fire or be available in the event of a fire.

3. Assess the event situation and determine if it meets the criteria to abandon and evacuate the Control Room.

4. Follow current procedures to operate and achieve safe shutdown.