

From: Lashley, Phil H.
To: [Venkataraman, Booma](#)
Cc: [McCreary, Dave M](#)
Subject: [External_Sender] Beaver Valley NFPA 805 Amendment Application Draft Safety Evaluation
Date: Wednesday, November 29, 2017 8:26:06 AM
Attachments: [2017-11-28 Draft SE FENOC Comments.pdf](#)

Dear Ms. Venkataraman,

As requested by U.S. Nuclear Regulatory Commission correspondence dated November 9, 2017, the FirstEnergy Nuclear Operating Company and applicable contractors have reviewed the draft safety evaluation (SE) for proposed amendments regarding transition to NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants." Based on this review, the draft SE does not contain any proprietary or sensitive unclassified non-safeguards information. Specific items related to the factual accuracy and completeness of the SE were identified and are listed in the attached document for your consideration.

Respectfully,

Phil H. Lashley
Fleet Licensing Supervisor
Cell: (330) 696-7208
Office: (330) 315-6808
Mail Stop: A-WAC-B1

The information contained in this message is intended only for the personal and confidential use of the recipient(s) named above. If the reader of this message is not the intended recipient or an agent responsible for delivering it to the intended recipient, you are hereby notified that you have received this document in error and that any review, dissemination, distribution, or copying of this message is strictly prohibited. If you have received this communication in error, please notify us immediately, and delete the original message.

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
3	1	1	Title	-	Amendment Nos. 301 and 190 should be inserted in the title.		Same title as preceding page.
4	1, 9	various		-	"First Energy" should be "FirstEnergy" throughout document.		See licensee name in second paragraph of draft SE Reference 8 (ML14002A086).
5	1.2	4	3rd full paragraph on page	... implement under 10 CFR 50.48(a), and (c) the results...	A comma and "and" need to be re-arranged.	... implement under 10 CFR 50.48(a) and (c), and the results....	
6	2.2	8	1	The NRC staff's review also relied on the following additional codes, RGs, and standards:	NUREG-2180 is not listed	Include a new bullet for: NUREG-2180, "Determining the Effectiveness, Limitations, and Operator Response for Very Early Warning Fire Detection Systems in Nuclear Facilities (DELORES-VEWFIRE)"	Licensee response to PRA RAI 27 (Reference 17 - ADAMS Accession No. ML17030A312) and PRA RAI 03 (Reference 19 - ADAMS Accession No. ML17177A097)
7	2.2	11	4	The NRC staff's review also relied on the following additional codes, RGs, and standards:	NUREG-1824, Supplement 1 is not listed	Include a bullet for NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications, Supplement 1" or supplement the existing NUREG-1824 bullet similar to the NUREG/CR-6850 bullet and discussion.	NUREG-1824, Supplement 1 (Reference 165 - ADAMS Accession No. ML16309A011) and Draft SER Attachment A and Attachment B
8	2.4.1	17	2	The licensee requested that 25 exemptions be rescinded for Beaver Valley, Unit No. 1. Since Beaver Valley, Unit No. 2, was licensed to operate after January 1, 1979, licensing actions associated with 10 CFR 50, Appendix R, were not issued as exemptions to the regulation, and therefore, the licensee did not request that any exemptions be rescinded for Beaver Valley, Unit No. 2 . The licensee also determined that no orders need to be superseded or revised to implement an FPP that complies with 10 CFR 50.48(c).	There are 26 total exemptions as identified in the supplemented Attachment K (L-17-122 ML17111A887) Note Attachment O did not include new LA 11.26 (lack of fire extinguishers, identified in Attachment L review). Attachment K described below lists the correct Licensing Actions that will and will not be transitioned. This should be okay. Only thing that needs corrected is that there are 26 total, not 25.	The licensee requested that 26 exemptions be rescinded for Beaver Valley, Unit No. 1.	Supplemented Attachment K (L-17-122 ML17111A887) Enclosure B

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
9	2.4.1	17	2	The licensee requested that 25 exemptions be rescinded for Beaver Valley, Unit No. 1. Since Beaver Valley, Unit No. 2, was licensed to operate after January 1, 1979, licensing actions associated with 10 CFR 50, Appendix R, were not issued as exemptions to the regulation, and therefore, the licensee did not request that any exemptions be rescinded for Beaver Valley, Unit No. 2 . The licensee also determined that no orders need to be superseded or revised to implement an FPP that complies with 10 CFR 50.48(c).	Unit 2 deviations need to be described. There are a total of 31 Unit 2 Licensing Actions with 11 of the them transitioning.	Since Beaver Valley, Unit No. 2, was licensed to operate after January 1, 1979, licensing actions associated with 10 CFR 50, Appendix R, were not issued as exemptions to the regulation, and therefore, the licensee did not request that any exemptions be rescinded for Beaver Valley, Unit No. 2, but were listed as deviations. The licensee requested that 31 deviations be rescinded for Beaver Valley, Unit No. 2.	Supplemented Attachment K (L-17-122 ML17111A887) Enclosure B; SER Section 3.5.1.3
10	2.4.1	17	3	The NRC staff accepts the licensee's determination that 25 exemptions should be rescinded for Beaver Valley, Unit No. 1, and that no orders need to be superseded or revised to implement NFPA 805 at Beaver Valley. (See SE Section 2.5 for the NRC staff's detailed evaluation of the exemptions being rescinded.)	There are 26 total exemptions as identified in the supplemented Attachment K (L-17-122 ML17111A887). Unit 2 deviations need to be described. There are a total of 31 Unit 2 Licensing Actions with 11 of the them transitioning.	The NRC staff accepts the licensee's determination that 26 exemptions should be rescinded for Beaver Valley, Unit No. 1, and 31 deviations should be rescinded for Beaver Valley, Unit No. 2 , and that no orders need to be superseded or revised to implement NFPA 805 at Beaver Valley. (See SE Section 2.5 for the NRC staff's detailed evaluation of the exemptions being rescinded.)	Supplemented Attachment K (L-17-122 ML17111A887) Enclosure B; SER Section 3.5.1.3
11	2.5	20	2	The licensee previously requested and received NRC approval for 26 exemptions from 10 CFR Part 50, Appendix R. These exemptions were discussed in detail in LAR Attachment K, as supplemented. The licensee requested that the exemptions be rescinded and that the underlying engineering evaluations for 9 of the 25 exemptions be transitioned to the new licensing basis under 10 CFR 50.48(a) and 50.48(c), as previously approved (NFPA 805, Section 2.2.7), and compliant with the new regulation.	This should state 6 of the 26 exemptions are being transitioned.	The licensee previously requested and received NRC approval for 26 exemptions from 10 CFR Part 50, Appendix R. These exemptions were discussed in detail in LAR Attachment K, as supplemented. The licensee requested that the exemptions be rescinded and that the underlying engineering evaluations for 6 of the 26 exemptions be transitioned to the new licensing basis under 10 CFR 50.48(a) and 50.48(c), as previously approved (NFPA 805, Section 2.2.7), and compliant with the new regulation.	Supplemented Attachment K (L-17-122 ML17111A887) Enclosure B; SER Section 3.5.1.3
12	2.5	22	4	The following exemptions are rescinded, but the engineering evaluation of the underlying condition will be used as a qualitative engineering evaluation for transition to NFPA 805 (see SE Section 3.5.1.1):	This should state (see SE Section 3.5.1.3)	The following exemptions are rescinded, but the engineering evaluation of the underlying condition will be used as a qualitative engineering evaluation for transition to NFPA 805 (see SE Section 3.5.1.3):	Supplemented Attachment K (L-17-122 ML17111A887) Enclosure B; SER Section 3.5.1.3

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
13	2.5	22		N/A	The Unit 2 Deviations need to be added to this section.	The following deviations are rescinded as requested by the LAR. The underlying condition has been evaluated using RI/PB methods and found to be acceptable with no further actions, because the philosophy of DID and sufficient safety margins are maintained (numbering scheme provided by the licensee): All 31 deviations need listed, with the 11 deviations that will be transitioning also listed.	Supplemented Attachment K (L-17-122 ML17111A887) Enclosure B; SER Section 3.5.1.3
14	2.6.1	25	1	Deterministic Approach: Comply with NFPA 805, Chapter 2, and Section 4.2.3 requirements; or	NFPA 805 Chapter 3	Deterministic Approach: Comply with NFPA 805, Chapter 3, and Section 4.2.3 requirements; or	NFPA 805 Chapter 3
15	2.6.2	28	1	Accordingly, these cause and effect relationship models may be used after transition to NFPA 805 as a part of the FREs conducted to determine the change in risk associated with proposed plant changes.	BV plans to use the Change Evaluation Process discussed in NFPA 805 Sections 2.2(h), 2.2.9 & 2.4.4 for all future plant modification or other changes to the Fire Protection Program (FPP). BV plans to follow the guidance in RG 1.205 Regulatory Position C.3.2 "NFPA 805 Plant Change Evaluation Process." BV does not intend to use the Fire Risk Evaluation Process discussed in NFPA 805 Section 4.2.4.2. This process was followed during the transition to NFPA 805 as discussed in RG 1.205 Regulator Position C2.4.	Accordingly, these cause and effect relationship models may be used after transition to NFPA 805 as a part of the Change Evaluation Process conducted to determine the change in risk associated with proposed plant changes.	RG 1.205 (Reference 4 - ML092730314)
16	2.7.1	28	1	As described below, LAR Attachment S, Table S 2, "Plant Modifications Committed," as supplemented, provides a description of each of the proposed plant modifications, presents the problem statement explaining why the modification is needed, and identifies the compensatory actions required to be in place pending completion/implementation of the modification.	Attachment S does not "identify the compensatory actions required to be in place", it only indicates whether a compensatory measure is required or not.	As described below, LAR Attachment S, Table S 2, "Plant Modifications Committed," as supplemented, provides a description of each of the proposed plant modifications, presents the problem statement explaining why the modification is needed, and identifies if a compensatory actions is required to be in place pending completion/implementation of the modification.	Supplemented Attachment S (L-17-122 ML17111A887) Enclosure D

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B 2017-11-09 Draft SE Section No.	C 2017-11-09 Draft SE Page No.	D Paragraph No.	E 2017-11-09 Draft SE Statement	F Comment	G Proposed Revised Statement	H References
17	2.7.2	29	2	Each implementation item will be completed prior to the deadline for implementation of the RI/PB FPP based on NFPA 805 as specified in the license conditions and the letter transmitting the amended license (i.e., implementation period), which states that the licensee will implement the items listed in LAR Attachment S, Table S-3, as supplemented on August 22, 2017, 12 months after NRC issuance of the license amendments.	Table S-3, as supplemented on Aug. 22, 2017 (Reference 20), includes a caveat that certain specifically identified implementation items will not be complete in the 12 month transition period; instead those specific items (generally related to FPRA updates to account for final as-built configuration of mods) will be implemented within 2 refueling outages consistent with the S-2 modification implementation schedule.	Each implementation item will be completed prior to the deadline for implementation of the RI/PB FPP based on NFPA 805 as specified in the amended license (i.e., implementation period), which states that the licensee will implement the items listed in LAR Attachment S, Table S-3, as supplemented on August 22, 2017, 12 months after NRC issuance of the license amendments, except for those items specifically marked to be implemented according to the Table S-2 modification implementation schedule.	Reference 18 (ML17111A887), Note 1 at the end of Table S-3 on Page S-19 (pdf 261/261)
18	3.1.1.2	34	bullet list	-	One section should be added to this list: section 3.3.6. Ref 12 provided a table of sections that need to be changed from "Complies with Clarification" to either "Complies" or "Complies with use of EEEE". Ref 14 provided an update to that table – Table 5b.01. The third item is Section 3.3.6 with a compliance statement of "Complies with Use of EEEE – Functionally Equivalent." Other sections classified like this are given an explanation in the draft SER, confirming that the EEEE demonstrates the basis for being acceptable.	Add an evaluation of 3.3.6, Roofs, based on FPE RAI 05.02 and Table 5b.01	Reference 14

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
19	3.1.1.2	36	1	The licensee further stated that the engineering analysis determined that the majority of the electric cables used within the power block are equivalent to the requirements of NFPA 805, Section 3.3.5.3, and the low population of electric cables with potentially nonqualified electric cable insulation materials installed in electrical raceways is acceptable. The NRC staff concludes that the licensee's response to the RAI is acceptable because the licensee demonstrated that it used engineering evaluations to compare its cable installations against the criteria of NFPA 805 and the guidance of FAQ 06 0022 and determined that the insulation materials are acceptable.	A follow-up RAI was issued regarding NFPA 805 Section 3.3.5.3 (FPE RAI 04.01 L-15-371 ML15356A136), with the response stating that approval will be requested as an Attachment L Item. The Attachment L Item was submitted as Approval Request 6 . (L-16-058 ML16055A160). This should be updated to reflect the Approval Request, which is identified in SE Section 3.1.4.6 See SE page 194 for same comment.	Add: In FPE RAI 04.01 (Reference 25), the NRC staff stated in the engineering evaluation, the licensee concluded that the low population of cables that do not meet Institute of Electrical and Electronics Engineers (IEEE) Standard 383, 1974 Edition, or equivalent, were considered in the fire modeling evaluation and determined to be adequate for the hazard. In accordance with FAQ 06-0008, this type of EEEE cannot be self-approved by the licensee. In its response to FPE RAI 04.01 (Reference 14), the licensee stated that the compliance strategy for NFPA 805 Section 3.3.5.3, for the low population of cables with potentially non-qualified electrical cable insulation material installed in electrical raceways at BVPS-1 and BVPS-2 will be revised to "Submit for NRC Approval"	FPE RAI 04.01 (L-15-371 ML15356A136); L-16-058 (ML16055A160); SER Section 3.1.4.6 (pg 90)
20	3.1.1.2	42	2	125 Ventilation Duct Chase (VDC)	Incorrect acronym	125 Volts Direct Current	LAR Acronym List
21	3.1.1.2	43	3	The licensee stated that the halon systems in fire compartments 1 CV 3, 1 DG 1, 1 DG 2, and 2 SB 3 have been analyzed for over pressurization conditions for the area and determined that no additional vents are required.	Halon is only installed in 1-CV-3. CO2 is installed in 1-DG-1, 1-DG-2, and 2-SB-3.	The licensee stated that the halon system in fire compartment 1 CV 3 and CO2 systems in fire compartments , 1 DG 1, 1 DG 2, and 2 SB 3 have been analyzed for over pressurization conditions for the area and determined that no additional vents are required.	FPE RAI 05.02(a) (L-15-371 ML15356A136); original LAR Attachment A, Table B-1 3.10.3 records for 1-DG-1, 1-DG-2, and 2-SB-3.
22	3.1.1.3	46	2	In FPE RAI 7b (Reference 22), the NRC staff stated that in LAR Attachment A, Table B 1, the licensee stated in fire areas 2 CB 1 and 2 PA 3 that the 3M Interam E 50 series blanket assemblies were evaluated in an engineering evaluation to provide a 1 hour fire resistance rating for ductwork and a 2 hour fire resistance for the protection of the 1 ½ hour fire dampers	Typo: FPE RAI 17b	In FPE RAI 17b (Reference 22)	SER Reference 22
23	3.1.1.3	46	2	The licensee stated that the compliance strategy for NFPA 805, Section 3.11.5 for fire compartments 2 CB 1, 2 CV 1, 2 CV 3, 2 PA 4, 2 SB 3, and 2 SB 4 will be revised to delete references to fire barriers for ductwork, and the compliance strategy for NFPA 805, Section 3.11 for fire compartment 2 CB 1 will be revised to include the results of the engineering evaluation regarding fire barriers for ductwork.	Typo: NFPA 805, Section 3.11.2	NFPA 805, Section 3.11. 2	L-15-150 ML15147A372 pg 54

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
24	3.1.1.3	46	2	In a letter dated October 25, 2017 (Reference 21), the licensee indicated this change was made.	This statement is not contained within Ref 21 for this paragraph (it is confused with the previous paragraph).	In Attachment L Approval Request 5 , dated February 24, 2016 (Reference 15), the licensee indicated this change was made.	Reference 15
25	3.1.1.4	52	3	o In LAR Attachment A, the licensee stated that in fire compartments 2 SB 1, 2 SB 2, 2 SB 3, 2 SB 4, 2 SB 5, 2 SB 6, 2 SB 7, 2 SB 8, 2 SB 9, 2 WH 1, and 3 CR 1 there are HVAC duct penetrations in the barrier between the affected fire area and adjacent fire compartments that are protected by two 1½ hour fire rated dampers in series, and a deviation for using two 1½ hour fire dampers in lieu of one 3 hour fire damper, and in fire compartment 2 PA 3 ventilation ductwork is wrapped with 1 hour fire wrap material to extend the fire barriers in lieu of fire dampers at the barriers.	The following additional compartments state that ductwork is wrapped with 1 hour fire wrap material to extend the barrier, as noted in LAR Attachment A: 2-SB-3,	o In LAR Attachment A, the licensee stated that in fire compartments 2 SB 1, 2 SB 2, 2 SB 3 , 2 SB 4, 2 SB 5, 2 SB 6, 2 SB 7, 2 SB 8, 2 SB 9, 2 WH 1, and 3 CR 1 there are HVAC duct penetrations in the barrier between the affected fire area and adjacent fire compartments that are protected by two 1½ hour fire rated dampers in series, and a deviation for using two 1½ hour fire dampers in lieu of one 3 hour fire damper, and in fire compartment 2 PA 3 and 2 SB 3 ventilation ductwork is wrapped with 1 hour fire wrap material to extend the fire barriers in lieu of fire dampers at the barriers.	LAR Table B-1 Transition of Fundamental Fire Protection Program and Design Elements Worksheet Fire Protection Features Transition Report BVPS-2 A2 pages 284
26	3.1.1.4	52	1st bullet	In LAR Attachment A, the licensee stated that fire doors that are not 3-hour fire-rated are installed in fire compartments 1-CR-2, 1-CR-4, 1-CS-1, 1-CV-1, 1-CV-2, 1-ES-1, 1-ES-2, 1-FB-1, 1-MG-1, 1-MS-1, 1-NS-1, 1-PA-1E, 1-PA-1G, 1-PT-1, 1-SGPD-1, 1-TB-1, 3-CR-1, 3-IS-1, 3-IS-2, 3-IS-3, 3-IS-4, and 3-IS-6.	The following additional compartments were noted in LAR Attachment A: 1-PA-1A, 1-PA-1C, 1-PA-GA, 1-PA-GB, 1-PA-GC.	In LAR Attachment A, the licensee stated that fire doors that are not 3-hour fire-rated are installed in fire compartments 1-CR-2, 1-CR-4, 1-CS-1, 1-CV-1, 1-CV-2, 1-ES-1, 1-ES-2, 1-FB-1, 1-MG-1, 1-MS-1, 1-NS-1, 1-PA-1A, 1-PA-1C, 1-PA-1E, 1-PA-1G, 1-PA-GA, 1-PA-GB, 1-PA-GC, 1-PT-1, 1-SGPD-1, 1-TB-1, 3-CR-1, 3-IS-1, 3-IS-2, 3-IS-3, 3-IS-4, and 3-IS-6.	LAR Table B-1 Transition of Fundamental Fire Protection Program and Design Elements Worksheet Fire Protection Features Transition Report BVPS-1 A2 pages 259, 266, 298, 304, 310,
27	3.1.1.4	52	2nd bullet	In LAR Attachment A, the licensee stated that in fire compartments 2 ASP, 2 CB 1, 2 CB 6, 2 CV 1, 2 CV 2, 2 CV 3, 2 CV 5, 2 CV 6, 2 FB 1, 2 PA 4, and 2 PA 5, there are (HVAC duct penetrations in the barrier between the affected fire compartment...	Fire compartment 2-SG-1S (3.11.2) is not listed, but was identified in the FPE RAI 02 Table for NFPA 805 Section 3.11.2.	In LAR Attachment A, the licensee stated that in fire compartments 2 ASP, 2 CB 1, 2 CB 6, 2 CV 1, 2 CV 2, 2 CV 3, 2 CV 5, 2 CV 6, 2 FB 1, 2 PA 4, and 2 PA 5, and 2-SG-1S, there are HVAC duct penetrations in the barrier between the affected fire compartment...	FPE RAI 02 (L-15-150 ML15147A372 pg 11)
28	3.1.1.4	52	3rd Bullet	o In LAR Attachment A, the licensee stated that in fire compartments 2 SB 1, 2 SB 2, 2 SB 3, 2 SB 4, 2 SB 5, 2 SB 6, 2 SB 7, 2 SB 8, 2 SB 9, 2 WH 1, and 3 CR 1 there are HVAC duct penetrations in the barrier between the affected fire area and adjacent fire compartments that are protected by two 1½ hour fire rated dampers in series, and a deviation for using two 1½ hour fire dampers in lieu of one 3 hour fire damper,	Fire Compartments 2-PT-1, 2-SG-1S are not listed, but were identified in the FPE RAI 02 Table for NFPA 805 Section 3.11.3.	In LAR Attachment A, the licensee stated that in fire compartments 2-PT-1, 2 SB 1, 2 SB 2, 2 SB 3, 2 SB 4, 2 SB 5, 2 SB 6, 2 SB 7, 2 SB 8, 2 SB 9, 2-SG-1S, 2 WH 1, and 3 CR 1	FPE RAI 02 (L-15-150 ML15147A372 pgs 9,11)
29	3.1.1.4	54	1	NFPA 805 Section 3.11.3	Fire Compartment 2-RC-1 is not described in this section, but was listed in the FPE RAI 02 Table for NFPA 805 Section 3.11.3.	Add: In LAR Attachment A, the licensee stated that in fire compartment 2-RC-1, the containment access hatch does not contain a UL label or certification of fire testing....	FPE RAI 02 (L-15-150 ML15147A372 pg 9); SER Section 3.5.1 pg 193

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
30	3.1.1.4	54	1	NFPA 805 Section 3.11.3	Fire Compartments 2-TR-1, 2-TR-2, 2-TR-3 are not described but were in the FPE RAI 02 Table for NFPA 805 Section 3.11.2 to state the compliance basis changed from "Complies by Previous Approval" to "Performance-based-evaluation".	Add: Also in its response to FPE RAI 02, the licensee revised its compliance strategy to remove "Compliance by Previous Approval" to credit a performance-based evaluation for fire compartments 2-TR-1, 2-TR-2, and 2-TR-3.	FPE RAI 02 (L-15-150 ML15147A372 pgs 11)
31	3.1.1.5	55	5th bullet	Section 3.11.3, which concerns the requirement that the listed fire resistance rating for fire dampers is consistent with the designated fire resistance rating of the barrier as determined by the performance requirements established by Chapter 4. The licensee requested NRC approval for the use of a PB method to justify the use of two 1.5 hour rated fire dampers in series with a 1 hour fire wrap on the ductwork instead of a 3 hour fire damper, thereby meeting the requirements of NFPA 805. See SE Section 3.1.4.5.	Add discussion to align with Section 3.1.4.5 since in the supplemented Attachment L, Approval Request 5 does not identify "1-hour fire wrap". (L-16-162 ML16133A340 page L-1)	Add: In the revised Approval Request 5, approval was requested for the use of fire damper configurations that contain two 1.5-hour fire dampers in series as follows: 1. Two 1.5-hour fire dampers in series located within the fire barrier and 2. Two 1.5-hour fire dampers in series with one located within the fire barrier and one located close to, but outside, the fire barrier.	L-16-162 ML16133A340 page L-1; SER section 3.1.4.5 page 84.
32	3.1.1.6	62	3	NFPA 805, Section 3.4.3(a), ...The licensee included this action in LAR Attachment S, Table S-3, as supplemented, Implementation Item BV1-2371.	The LAR Attachment S, Table S-3 that requires update of fire brigade procedure is BV1-3020.	NFPA 805, Section 3.4.3(a), ... The licensee included this action in LAR Attachment S, Table S-3, as supplemented, Implementation Item BV1-3020.	Reference 8 and ADAMS accession number ML14002A086
33	3.1.1.6	63	1	In LAR Attachment A, the licensee identified an action to verify flow rate nozzle pressure for all hose stations upon completion the hydraulic calculations.	This does not align with what LAR Attachment A, Section 3.6.2 stated: "Will Comply With Use Of Commitment The capability to ensure an adequate water flow rate and nozzle pressure will be verified upon completion of hydraulic calculations."	In LAR Attachment A, the licensee identified an action to verify there is an adequate water flow rate and nozzle pressure for all hose stations by completion of hydraulic calculations.	Reference 8 and ADAMS accession number ML14002A086
34	3.1.1.6	63	2	NFPA 805, Section 3.8.2, ...The licensee identified actions in LAR Attachment S, Table S-2, as supplemented, Modifications BV1-1875, BV1-2839, BV1-2840, BV1-2841, and LAR Attachment S, Table S 3, as supplemented, Implementation Items BV1-2826, BV2-0487, and BV2-1022.	Item BV2-0487 is for CO2 discharge testing. BV2-1022 is for diesel room ventilation fan control. Neither of these are related to NFPA 72, nor the discussed fire compartments. They should be removed from this paragraph.	NFPA 805, Section 3.8.2, ...The licensee identified actions in LAR Attachment S, Table S-2, as supplemented, Modifications BV1-1875, BV1-2839, BV1-2840, BV1-2841, and LAR Attachment S, Table S 3, as supplemented, Implementation Items BV1-2826, BV2-0487, and BV2-1022.	Reference 8 and ADAMS accession number ML14002A086
35	3.1.1.6	65	2nd paragraph	The licensee included these actions in LAR Attachment S, Table S 3, as supplemented, Implementation Items BV1 3041 and BV1-1576.	This should be BV2-1576.	The licensee included these actions in LAR Attachment S, Table S 3, as supplemented, Implementation Items BV1 3041 and BV2-1576.	Ref 18 ML17111A887 2017-04-21, Enclosure B, Att. K

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
36	3.1.2	68	1	As stated in LAR Section 4.1.3, the power block includes structures that contain equipment that could affect plant operation for power generation, equipment important to safety, equipment that could affect the ability to maintain the NSCA in the event of a fire, or structures containing radioactive materials that could potentially be released in the event of a fire.	The words used in section 4.1.3 state "structures that have equipment required for nuclear plant operations." It does not specifically state - "structures that contain equipment that could affect plant operation for power generation, equipment important to safety, equipment that could affect the ability to maintain the NSCA in the event of a fire, or structures containing radioactive materials that could potentially be released in the event of a fire."	As stated in LAR Section 4.1.3, the power block includes structures that have equipment required for nuclear plant operations as identified in LAR Attachment I, Table I-1, "Beaver Valley, Unit No. 1 Power Block Definition," and LAR Attachment I, Table I-2, "Beaver Valley, Unit No. 2 Power Block Definition."	Reference 9 and ADAMS accession number ML14002A086
37	3.1.3.2	68	6	In LAR Attachment S, Table S-2, as supplemented, Modification Items BV1-1875 and BV2-0829, the licensee proposed the installation of very early warning fire detection systems (VEWFDS) in low voltage cabinets located in fire compartments 1-CR-4, 2-CB-1, and 2-CB-6	LAR Table S-2 item BV1-2854 will install incipient detection in an inverter cabinet greater than 250V (treated as a power cabinet per NUREG-2180) consistent with the LAR Attachment S Supplement and the response to PRA RAI 27.	"In LAR Attachment S, Table S-2, as supplemented, Modification Items BV1-1875, BV1-2854, and BV2-0829, the licensee proposed the installation of very early warning fire detection systems (VEWFDS) in low voltage select cabinets located in fire compartments 1-CR-4, 2-CB-1, and 2-CB-6"	Reference 17, ML17030A312, 2017-01-30, Attachment Page 2 and Reference 18, ML17111A887, 2017-04-21, Att 3 Page 2 and Enclosure D Page S-12.
38	3.1.3.2	69	8	The licensee further stated that sensitivity testing will include the gain and alarm thresholds, and that each detector will have an associated setpoint document that contains the alarm setpoints, which will be subject to design control program requirements.	This should be changed to "sensitivity settings."	The licensee further stated that sensitivity settings will include the gain and alarm thresholds, and that each detector will have an associated setpoint document that contains the alarm setpoints, which will be subject to design control program requirements.	FPE RAI 15B (L-15-118 ML15118A484 pg 11 of 68)
39	3.1.3.2	70	4	In its response to FPE RAI 15f (Reference 12) , the licensee stated that the VEWFDS will be connected to interface with the control room annunciation system, and that LAR Attachment S, Table S-2, as supplemented, was revised to include the modification. The licensee included this action in a letter dated April 21, 2017, in LAR Attachment S, Table S-2, as supplemented, Modification BV1-3110.	Both BV1 & 2 modifications have been completed. Items BV1-3110 and BV2-1624 "Interface the Unit1/2 Incipient Fire Detection System with the Main Control Room Annunciator System" were added to Table S-1	In its response to FPE RAI 15f (Reference 11) , the licensee stated that the VEWFDS will be connected to interface with the control room annunciation system, and that LAR Attachment S, Table S-2, as supplemented, was revised to include the modification. The modifications have been completed. The licensee included this action in a letter dated April 21, 2017, in LAR Attachment S, Table S-1, as supplemented, Modifications BV1- 3110 and BV2-1624.	Reference 18 and ADAMS accession number ML17111A887
40	3.1.3.2; 3.2.6.1	70; 122	4; 9	...in a letter dated April 21, 2017, ...	Include a reference to the Utility's letter.	...in a letter dated April 21, 2017 (Reference 18), ...	SE Reference 18, ML17111A887, L-17-122, Attachment 3 pg 1 and Updated pg S-8 (pdf Pg 250)

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
41	3.1.3.2	71	1	The detailed discussion of the VEWFDS in response to FPE RAI 15e, such as operator and operator response credited in the NSCA, is included in SE Section 3.2.6.	Include a reference for FPE RAI 15e.	The detailed discussion of the VEWFDS in response to FPE RAI 15e (Reference 11), such as operator and operator response credited in the NSCA, is included in SE Section 3.2.6.	SE Reference 11, ML15147A372, L-15-150, Pg 52
42	3.1.3.2	71	2	The NRC concludes that the licensee's response to FPE RAI 15a-c and RAI 15f is acceptable because the licensee demonstrated that the design, installation, maintenance, and operation of the VEWFDS is in accordance with the guidance contained in FAQ 08-0046, and the alarm annunciation system will comply with the requirements of NFPA 805, Section 3.8, subject to completion of LAR Attachment S, Table S-2, Modification BV1-3110	"FPE RAI 15a-c" should be "FRE RAI 15a-d" since the FPE RAI 15 discussion included a, b, c & d. Also "Table S-2. Modification BV1-3110" should be "Table S-1, Modification Items BV1-3110 and BV2-1624"	The NRC concludes that the licensee's response to FPE RAI 15a-d and RAI 15f is acceptable because the licensee demonstrated that the design, installation, maintenance, and operation of the VEWFDS is in accordance with the guidance contained in FAQ 08-0046, and the alarm annunciation system will complies with the requirements of NFPA 805, Section 3.8, as indicated by completion of LAR Attachment S, Table S-1, Modification Items BV1-3110 and BV2-1624 .	Reference 10 and ADAMS accession number ML151184A484 Reference 18 and ADAMS accession number ML17111A887
43	3.1.3.3	71	3	In its response to FPE RAI 01 (Reference 12)	FPE RAI 01 response is included in Reference 11	In its response to FPE RAI 01 (Reference 11)	Letter dated May 27, 2015
44	3.1.3.3	72	4	in accordance with Table FPE 01 of its response to FPE RAI 01 (Reference 12),	FPE RAI 01 response is included in Reference 11	in accordance with Table FPE 01 of its response to FPE RAI 01 (Reference 11),	Letter dated May 27, 2015
45	3.1.4.6	91	4	The licensee stated that for the thermoplastic/unknown cable types, it assumed bounding case thermoplastic flame propagation/spread, HRRs, and thermal damage criteria in the FM analysis. The licensee further stated that the FM analysis assumed a bounding case (thermoplastic) flame propagation/spread rate, HRR, and thermal damage criteria for raceways containing a mixture of thermoplastic and thermoset cable types, and that this results in a conservative and bounding FM analysis with regard to cable material types and associated flame propagation rates.	Cable trays with mixed thermoplastic and thermoset do not always use bounding case thermoplastic. Rather, the method used at BVPS is consistent with or more conservative than the guidance in NUREG/CR-7010.	The licensee stated that for the thermoplastic/unknown cable types, it assumed bounding case thermoplastic flame propagation/spread, HRRs, and thermal damage criteria in the FM analysis. The licensee further stated that the FM analysis assumed a bounding case (thermoplastic) is consistent with or more conservative than the approved guidance (i.e., NUREG/CR-7010, NUREG/CR-6850) with regards to flame propagation/spread rate, HRR, and thermal damage criteria for raceways containing a mixture of thermoplastic and thermoset cable types, and that this results in a conservative and bounding FM analysis with regard to cable material types and associated flame propagation rates.	Letter L-17-358 DRAFT SER Attachment A, Page 8
46	3.2.1	105	10	...As described in Section 4.2.1.1 and Attachment B of the LAR, the licensee performed a review against the guidance of NEI 00-01, Revision 2, to identify substantive changes from NEI 00-01, Revision 1, that are applicable to the NFPA 805 transition....	Unable to locate in Attachment B a description of the referenced review. This is only described in LAR Section 4.2.1.1.	...As described in Section 4.2.1.1 and Attachment B of the LAR, the licensee performed a review against the guidance of NEI 00-01, Revision 2, to identify substantive changes from NEI 00-01, Revision 1, that are applicable to the NFPA 805 transition....	ADAMS Package Accession No. ML14002A086 (LAR Attachment B).

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
47	3.2.1	106	4	In Safe Shutdown Analysis (SSD) RAI 01 (Reference 22), the NRC staff ... requested that the licensee clarify the discrepancy. In its response to SSD RAI 01 (Reference 10), the licensee stated...	Typo: the response to SSD RAI 01 is in Reference 11, not Reference 10.	In Safe Shutdown Analysis (SSD) RAI 01 (Reference 22), the NRC staff ... requested that the licensee clarify the discrepancy. In its response to SSD RAI 01 (Reference 11), the licensee stated...	Reference 11, ADAMS accession number ML15147A372, Attachment L-15-150, Page 56.
48	3.2.1.4	112	2	...The licensee stated that decay heat is removed by use of a natural circulation cooldown and steam release by the main steam safety valves and manual operation of atmospheric dump valves or RHR and that AFW is credited to supply cooling water to the SGs...	The "RHR" abbreviation is ambiguous in this context: recommend this be clarified to distinguish between the RHR <u>Valve</u> and the RHR <u>System</u> . The RHR System is not credited for Hot Standby, while the RHR Valve is an alternative to the atmospheric dump valves.	...The licensee stated that decay heat is removed by use of a natural circulation cooldown and steam release by the main steam safety valves and manual operation of atmospheric dump valves or RHR <u>valve</u> and that AFW is credited to supply cooling water to the SGs...	Section 2.2.2, Page 115, under "Decay Heat Removal".
49	3.2.1.5	113	4	...The licensee further stated that the turns ratio analysis is based upon NUREG/CR 7150, "Joint Assessment of Cable Damage and Quantification of Effects from Fire (JACQUE FIRE), Volume 2: Expert Elicitation Exercise for Nuclear Power Plant Fire Induced Electrical Circuit Failure " (Reference 128), which concluded...	Typo: Volume 2 of JACQUE-FIRE is Reference 141, not 128.	...The licensee further stated that the turns ratio analysis is based upon NUREG/CR 7150, "Joint Assessment of Cable Damage and Quantification of Effects from Fire (JACQUE FIRE), Volume 2: Expert Elicitation Exercise for Nuclear Power Plant Fire Induced Electrical Circuit Failure " (Reference 141), which concluded...	Section 9.0, Page 244, Reference 141.
50	3.2.4	119	6	... The results of the MSO expert panel discussions were added to each of these tables; and The MSOs that were added to the NSCA and resulted in failures are documented as VFDRs, and resolutions are documented in LAR Attachment B, Table B-3.	Table B-3 is not LAR Att. B but is LAR Att. C	... The results of the MSO expert panel discussions were added to each of these tables; and The MSOs that were added to the NSCA and resulted in failures are documented as VFDRs, and resolutions are documented in LAR Attachment C, Table B-3.	Reference 9 and ADAMS accession number ML14002A086
51	3.2.5	120	6	As described in LAR Section 4.2.1.3, the licensee's process is based on the methodology of FAQ 07-0030 (Reference 131) and consisted of the following steps:	The reference for FAQ 07-0030 is Reference 72. The reference for FAQ 07-0030 is not Reference 131.	As described in LAR Section 4.2.1.3, the licensee's process is based on the methodology of FAQ 07-0030 (Reference 72) and consisted of the following steps:	Reference 72
52	3.2.6.1	122	6	In LAR Attachment S, Table S-2, as supplemented, Modification Items BV1-1875 and BV2-0829, the licensee indicated that a VEWFDS will be added as follows:	LAR Table S-2 item BV1-2854 will install incipient detection in an inverter cabinet greater than 250V (treated as a power cabinet per NUREG-2180) consistent with the LAR Attachment S Supplement and the response to PRA RAI 27.	In LAR Attachment S, Table S-2, as supplemented, Modification Items BV1-1875, BV1-2854 , and BV2-0829, the licensee indicated that a VEWFDS will be added as follows:	Reference 17, ML17030A312, 2017-01-30, Attachment Page 2 Reference 18, ML17111A887, 2017-04-21, Att 3 Page 2 and Enclosure D Page S-12.

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
53	3.2.6.1	122	10	In LAR Attachment W, the licensee stated that the installation of VEWFDS incipient detection in low voltage cabinets located in fire compartments 1 CR 4, 2 CB 1, and 2 CB 6 is to reduce the likelihood of fire propagation outside the cabinets	To clarify, suggest adding that "VEWFDS will be installed in the 480V Computer Inverter and credited in accordance with NUREG-2180."	In LAR Attachment W, the licensee stated that the installation of VEWFDS incipient detection in low voltage cabinets located in fire compartments 1-CR-4, 2-CB-1, and 2-CB-6 is to reduce the likelihood of fire propagation outside the cabinets. VEWFDS will also be installed in one 480 VAC cabinet in accordance with NUREG 2180 (Ref. 17)	PRA RAI 27 (L-17-024, ML17030A312 pg 2 of 3) BV1-2854
54	3.2.7	124	2	The NRC staff reviewed the proposed installation of a VEWFDS to monitor conditions in certain key electrical cabinets at Beaver Valley as described in LAR Modification Items BV1-1875 and BV2-0829, and in its response to FPE RAI 15.	LAR Table S-2 item BV1-2854 will install incipient detection in an inverter cabinet greater than 250V (treated as a power cabinet per NUREG-2180) consistent with the LAR Attachment S Supplement and the response to PRA RAI 27.	The NRC staff reviewed the proposed installation of a VEWFDS to monitor conditions in certain key electrical cabinets at Beaver Valley as described in LAR Modification Items BV1-1875, BV1-2854 and BV2-0829, and in its response to FPE RAI 15 and PRA RAI 27.	Reference 17, ML17030A312, 2017-01-30, Attachment Page 2 Reference 18, ML17111A887, 2017-04-21, Att 3 Page 2 and Enclosure D Page S-12.
55	3.4.1.2	127	6	each retained VFDR was evaluated against the safety margin criteria	Safety margin was evaluated for the compartment and not for each VFDR	each compartment with VFDRs was evaluated against the safety margin criteria	LAR Section 4.5.2.2
56	3.4.1.2	127	6 (bullet 1)	FM for the FPRA was specifically reviewed for adequate safety margin and, in general, was developed utilizing industry, NRC, and National Institute of Standards and Technology (NIST) accepted codes, supported by guidance that includes NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities"; NEI 04-02; and associated FAQs resolutions as described in LAR Section 3.4 and specifically identified throughout the LAR.	BVPS has used additional FAQs that are not listed in LAR Section 3.4	FM for the FPRA was specifically reviewed for adequate safety margin and, in general, was developed utilizing industry, NRC, and National Institute of Standards and Technology (NIST) accepted codes, supported by guidance that includes NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities"; NEI 04-02; and associated FAQs resolutions as described in LAR Section 3.4 and specifically identified throughout the LAR and subsequent RAI responses.	SER Reference 10, 11, and 12 (responses to PRA RAI 4,7,9, and 25)
57	3.4.1.2	128	5 (very last sentence in the section)	Based on its review of the LAR, the FREs, and the licensee's response to PRA RAI 20	should refer to PRA RAI 21, instead of 20	Based on its review of the LAR, the FREs, and the licensee's response to PRA RAI 21	Reference 11, ML1547A372. (pages 179 and 183, or pdf 181 and 185)
58	3.4.2.2	131	2	accordance with NEI 07-01 (Reference 139)	Typo - NEI 07-01 should be NEI 07-12	accordance with NEI 07- 12 (Reference 139)	N/A
59	3.4.2.2	132	3	In PRA RAI 01.a (Reference 22) associated with F&O CF-A1-0, the NRC staff stated that the licensee's use of Option #2 from NUREG/CR-6850...	Missing a digit in the F&O reference	In PRA RAI 01.a (Reference 22) associated with F&O CF-A1- 01 , the NRC staff stated that the licensee's use of Option #2 from NUREG/CR-6850...	Reference 22 and ADAMS accession number ML15049A507

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
60	3.4.2.2	132	4	In PRA RAI 1.c (Reference 22) concerning F&O QNS-C1-01, the NRC staff requested that the licensee provide justification for the sufficiency of the sampling method it used to determine that the sum of the LERF contributions for all screened scenarios was less than 10 percent of the estimated total LERF for fire events. In its response to PRA RAI 01.c (Reference 10), the licensee explained that scenarios having a CDF higher than 1E-08 were retained and that LERF screening was performed on the next most risk dominant scenarios (i.e., scenarios with a CDF between 1E-08/year and 1E-09/year). The licensee explained that it compared the total LERF of the screened scenarios for each unit to the LERF of unscreened scenarios (i.e., scenarios with a CDF higher than 1E-08/year) and used this comparison to conservatively calculate the ratio of screened LERF scenarios to total LERF, which was determined to be about 3 percent	The F&O discussed in this RAI applies to BV1 only (BV2 LERF was fully quantified and screened appropriately). The draft statement refers to the additional sampling screening as applicable to both units.	In PRA RAI 1.c (Reference 22) concerning F&O QNS-C1-01, the NRC staff requested that the licensee provide justification for the sufficiency of the sampling method it used to determine that the sum of the LERF contributions for all screened scenarios at Unit 1 was less than 10 percent of the estimated total LERF for fire events. In its response to PRA RAI 01.c (Reference 10), the licensee explained that scenarios having a CDF higher than 1E-08 were retained and that LERF screening was performed on the next most risk dominant scenarios (i.e., scenarios with a CDF between 1E-08/year and 1E-09/year). The licensee explained that it compared the total LERF of the screened scenarios for Unit 1 to the LERF of unscreened scenarios (i.e., scenarios with a CDF higher than 1E-08/year) and used this comparison to conservatively calculate the ratio of screened LERF scenarios to total LERF, which was determined to be about 3 percent	Reference 10, ML15118A484. (page 28 of 68, or pdf 30/70). First sentence of the RAI response.
61	3.4.2.2	132	4	The NRC staff concludes that the licensee's response to the RAI is acceptable because the licensee demonstrated that its treatment of quantitative screening using the simplified approach is sufficient to show that the ratio of quantitatively screened LERF scenarios is a small fraction of the total LERF for both units and because all fire scenarios would be rescreened prior to self approval.	The F&O discussed in this RAI applies to BV1 only (BV2 LERF was fully quantified and screened appropriately). The draft statement refers to the additional sampling screening as applicable to both units.	The NRC staff concludes that the licensee's response to the RAI is acceptable because the licensee demonstrated that its treatment of quantitative screening using the simplified approach is sufficient to show that the ratio of quantitatively screened LERF scenarios is a small fraction of the total LERF for Unit 1 and because all fire scenarios would be rescreened prior to self approval.	Reference 10, ML15118A484. (page 28 of 8, or pdf 30/70). First sentence of the RAI response.
62	3.4.2.2	132	4	Implementation Items BV1-3108 and BV2-1662	Typo - BV2-1662 should be BV2-1622	Implementation Items BV1-3108 and BV2- 1622	N/A
63	3.4.2.2	135	2	In its response to PRA RAI 05 (Reference 10), the licensee explained that it credited RAs associated with repairs for DID but did not credit them in the FPRA.	Wrong reference	In its response to PRA RAI 05 (Reference 11), the licensee explained that it credited RAs associated with repairs for DID but did not credit them in the FPRA.	Reference 11 and ADAMS accession number ML15147A372
64	3.4.2.2	138	4	In its response to PRA RAI 13 (Reference 11), the licensee explained that Unit Nos. 1 and 2 are physically separate units and that the partitioning of the plants into PAUs for the FPRA was performed to maintain this separation with the exception of locations where cable or equipment from both units was located.	Wrong reference	In its response to PRA RAI 13 (Reference 11 10), the licensee explained that Unit Nos. 1 and 2 are physically separate units and that the partitioning of the plants into PAUs for the FPRA was performed to maintain this separation with the exception of locations where cable or equipment from both units was located.	Reference 10 and ADAMS accession number ML15118A484

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
65	3.4.2.2	139	2	In its response to PRA RAI 14 (Reference 11) and PRA RAI 03 (Reference 19), the licensee explained that based on a sensitivity study, the impact of SOKC was determined to be very small, and therefore, was not included in the risk estimates in its integrated analysis.	PRA RAI 14 response was contained in Reference 10 (ML15118A484), not Reference 11 (ML15147A372)	In its response to PRA RAI 14 (Reference 10) and PRA RAI 03 (Reference 19), the licensee explained that based on a sensitivity study, the impact of SOKC was determined to be very small, and therefore, was not included in the risk estimates in its integrated analysis.	Reference 10, ML15118A484. (page 41 of 68, or pdf 43/70).
66	3.4.2.2	139	3	In its response to PRA RAI 15 (Reference 11), the licensee explained that the HRA used to support the LAR reflects the guidance in the final July 2012 NUREG-1921 report, and therefore, there is no impact to the risk estimates from using the draft version.	Wrong reference	In its response to PRA RAI 15 (Reference 10), the licensee explained that the HRA used to support the LAR reflects the guidance in the final July 2012 NUREG-1921 report, and therefore, there is no impact to the risk estimates from using the draft version.	Reference 10 and ADAMS accession number ML15118A484
67	3.4.2.2	140	2	(i.e., Unit No. 1 - CDF of 5.9E-05/year and LERF of 4.3E-07/year; Unit No. 2 - CDF of 6.9E05/year and LERF of 1.8E-06/year),	Unit 2 CDF should be 6.9E-05 not 6.9E05	(i.e., Unit No. 1 - CDF of 5.9E-05/year and LERF of 4.3E-07/year; Unit No. 2 - CDF of 6.9E-05/year and LERF of 1.8E-06/year),	N/A
68	3.4.2.2	140	2	"In its response to PRA RAI 19 (Reference 12), the licensee provided the total risk increase associated with retained VFDRs without crediting risk reduction plant modifications....."	Wrong reference	"In its response to PRA RAI 19 (Reference 12), the licensee provided the total risk increase associated with retained VFDRs without crediting risk reduction plant modifications....."	Reference 19 and ADAMS accession number ML17177A097
69	3.4.2.2	142	2	In its response to PRA RAI 03.b (Reference 12)	The response to PRA RAI 03.b is Reference 19.	In its response to PRA RAI 03.b (Reference 19)	Reference 19 ML17177A097 2017-06-23
70	3.4.2.2	142	2	Table S 3, to fully apply the guidance contained in NUREG 2160 and NUREG 2178	Typo - NUREG 2160 should be NUREG 2169	Table S 3, to fully apply the guidance contained in NUREG 2169 and NUREG 2178	N/A
71	3.4.2.2 & 9.0	139, 238 & 244	3, Reference 60, & Reference 145	In PRA RAI 15 (Reference 22), the NRC staff explained that guidance in a draft version of NUREG-1921, "EPRI/NRC-RES Fire Human Reliability Guidelines" (Reference 145)...	NUREG-1921 is listed in the reference section twice. Suggest removing reference 145 from Section 9.0 and updating reference on page 139 to Reference 60	In PRA RAI 15 (Reference 22), the NRC staff explained that guidance in a draft version of NUREG-1921, "EPRI/NRC-RES Fire Human Reliability Guidelines" (Reference 60)...	SER Section 9.0
72	3.4.2.3.1	144	1	V &V of these algebraic models is documented in NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," Volumes 3 and 4 (Reference 57).	LAR Attachment J and SER Attachment A reference NUREG-1824, Supplement 1 as the V&V basis for the algebraic models. Update accordingly	V&V of these algebraic models is documented in NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications, Supplement 1" Volumes 3 and 4 (Reference 165).	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887)
73	3.4.2.3.1	144	3	This HGL correlation is described in NUREG-1805, and its V&V is documented in NUREG-1824, Volume 3.	LAR Attachment J and SER Attachment A reference NUREG-1824, Supplement 1 as MQH's HGL Correlation V&V basis. Update accordingly	This HGL correlation is described in NUREG-1805, and its V&V is documented in NUREG-1824, Supplement 1.	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887)

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
74	3.4.2.3.1	144	4	In LAR Section 4.5.1.2, the licensee identified the use of the following empirical correlations that are not addressed in NUREG-1824, Volumes 3 and 4.	LAR Section 4.5.1.2 does not provide a list of empirical correlations. This needs to be verified.	In LAR Attachment J , the licensee identified the use of the following empirical correlations that are not addressed in NUREG-1824, Volumes 3 and 4.	
75	3.4.2.3.1	144	14	All algebraic fire models and empirical correlations were implemented in a database and workbook referred to as the Fire Modeling Workbook (FMWB).	Algebraic fire models and empirical correlations were not implemented into a database.	All algebraic fire models and empirical correlations were implemented in a database and workbook referred to as the Fire Modeling Workbook (FMWB).	LAR Attachment J, Page J-13 Reference 18, ML17111A887, 2017-04-21, Enclosure A, Page J-14
76	3.4.2.3.1	144	4, 2nd bullet	"Ceiling Jet Temperature, Method of Alpert (Reference 150)"	Remove ceiling jet temperature correlation from this bulleted list. It is V&V'd per Section 6.2 of NUREG-1824	"Ceiling Jet Temperature, Method of Alpert (Reference 150)"	Section 6.2, NUREG-1824, Volume 4 (Reference 57) Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Supplemented LAR Attachment J
77	3.4.2.3.1	145	1	The licensee's screening was based on the 98th percentile fire HRR from the NUREG/CR-6850 methodology (Reference 51).	HRRs from NUREG-2178 are also used.	The licensee's screening was based on the 98th percentile fire HRR from the NUREG/CR-6850 methodology (Reference 51) and NUREG-2178 (Reference 140) .	DRAFT SER Section 3.4.2.2 Response to PRA RAI 03.b (Reference 19), Attachment 1, Page 8
78	3.4.2.3.1	145	5	V&V of CFAST and FDS is documented in NUREG-1824, Volumes 5 and 7, respectively.	NUREG-1824, Supplement 1 used as the V&V basis for FDS Version 6 analyses	V&V of CFAST and FDS is documented in NUREG-1824, Volumes 5 and 7, respectively as well as NUREG-1824, Supplement 1 (Reference 165) .	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Supplemented LAR Attachment J
79	3.4.2.3.1	155	1st bullet, 2nd paragraph	"The licensee also stated that it credited fire wraps and barrier systems for the duration of the manufacturer's rating, but that it did not credit wraps within the ZOI of a high hazard event to prevent damage in those scenarios."	Per response to FM RAI 02.b, neither cable tray covers fire wraps were credited in high hazard events	"The licensee also stated that it credited fire wraps and barrier systems for the duration of the manufacturer's rating. but that it The licensee did not credit wraps or cable tray covers within the ZOI of a high hazard event to prevent damage in those scenarios."	Licensee Response to RAIs dated 2015-06-26 (Reference 12 - ADAMS Accession No. ML15177A110), Page 52
80	3.4.2.3.2	152	1	cabinets in the MCR are separated by a single metal wall with cables in direct contact	This was a conservative assumption and was not verified	cabinets in the MCR are conservatively assumed to be separated by a single metal wall with cables in direct contact	FM RAI 01.j(vii)
81	3.4.3	158	3	The NRC staff concludes that the licensee's approach for calculating the change in risk associated with VFDRs is acceptable because it is consistent with RG 1.205, Section 2.2.4.1, and FAQ 08-0054 (Reference 79).	The reference for FAQ 08-0054 is Reference 80. The reference for FAQ 08-0054 is not Reference 79.	The NRC staff concludes that the licensee's approach for calculating the change in risk associated with VFDRs is acceptable because it is consistent with RG 1.205, Section 2.2.4.1, and FAQ 08-0054 (Reference 79 80).	Reference 80

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
82	3.4.4	158	3	The licensee identified a large number of RAs in its LAR Attachment G, Table G-1, provided in its response to PRA RAI 03 (Reference 19). In PRA RAI 18 (Reference 22), NRC staff requested that the licensee provide clarification regarding which RAs were identified for only DID.	There are two table in LAR Attachment G: Table G-1 and Table G-2. See LIC (20) in Reference 19.	The licensee identified a large number of RAs in its LAR Attachment G, Table G-1 and Table G-2, provided in its response to PRA RAI 03 (Reference 19). In PRA RAI 18 (Reference 22), NRC staff requested that the licensee provide clarification regarding which RAs were identified for only DID.	Reference 19 and ADAMS accession number ML17177A097
83	3.4.4	159	2	The NRC staff concludes that the CDF and LERF for both units are above the risk acceptance guidelines of 1E05/year and 1E 6/year contained in RG 1.174, respectively.	The risk acceptance guideline for CDF is 1E-05, not 1E05.	The NRC staff concludes that the CDF for both units are above the risk acceptance guidelines of 1E-05/year and LERF is below the risk acceptance guidelines of 1E-06/year contained in RG 1.174.	(ADAMS Accession No. ML17177A097).
84	3.4.4	159	3	The licensee reviewed all of the RAs for adverse impact and resolved each action as stated in LAR Attachment G. The NRC staff found that none of the RAs listed in LAR Attachment G, Table G-1, have an adverse impact on the FPRA. The licensee evaluated all RAs against the feasibility criteria provided in NEI 04-02, FAQ 07-0030, and RG 1.205. In addition, the licensee included an action in LAR Attachment S, Table S-3, Implementation Item BV1-3027, to demonstrate and document the feasibility of credited NFPA 805 RAs and update training and brigade drills after the fire response procedures are updated. The NRC staff concludes that this action is acceptable because it will incorporate the provisions of NFPA 805 into the FPP and would be required by the proposed license condition.	There are two tables in LAR Attachment G: Table G-1 and Table G-2. See LIC (20) in Reference 19.	The licensee reviewed all of the RAs for adverse impact and resolved each action as stated in LAR Attachment G. The NRC staff found that none of the RAs listed in LAR Attachment G, Table G-1 and Table G-2, have an adverse impact on the FPRA. The licensee evaluated all RAs against the feasibility criteria provided in NEI 04-02, FAQ 07-0030, and RG 1.205. In addition, the licensee included an action in LAR Attachment S, Table S-3, Implementation Item BV1-3027, to demonstrate and document the feasibility of credited NFPA 805 RAs and update training and brigade drills after the fire response procedures are updated. The NRC staff concludes that this action is acceptable because it will incorporate the provisions of NFPA 805 into the FPP and would be required by the proposed license condition.	Reference 19 and ADAMS accession number ML17177A097
85	3.4.6	160	4	In its response to PRA RAI 19 (Reference 11), the licensee provided its explanation of how it made modelling adjustments so that the change in risk was not underestimated.	Wrong reference	In its response to PRA RAI 19 (Reference 19), the licensee provided its explanation of how it made modelling adjustments so that the change in risk was not underestimated.	Reference 19 and ADAMS accession number ML17177A097

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
86	3.4.6	160	4	In PRA RAI 19 (Reference 22), the NRC staff explained that conservatisms in the compliant plant model could have caused overestimation of the risk offset values and underestimation of the change in risk. The NRC staff requested that the licensee identify conservative modeling or modelling assumptions resulting in underestimation of the change in risk and to show that in such cases the underestimation could still be offset by the decrease associated with non VFDR modifications. In its response to PRA RAI 19 (Reference 11), the licensee provided its explanation of how it made modelling adjustments so that the change in risk was not underestimated.	I think this section should also refer to PRA RAI 19.01 and its response, which further discussed this issue.	In PRA RAI 19 (Reference 22) and PRA RAI 19.01 (Reference 29) , the NRC staff explained that conservatisms in the compliant plant model could have caused overestimation of the risk offset values and underestimation of the change in risk. The NRC staff requested that the licensee identify conservative modeling or modelling assumptions resulting in underestimation of the change in risk and to show that in such cases the underestimation could still be offset by the decrease associated with non VFDR modifications. In its responses to PRA RAI 19 (Reference 11) and PRA RAI 19.01 (Reference 20) , the licensee provided its explanation of how it made modelling adjustments so that the change in risk was not underestimated.	Reference 20, ML17235A512. (page 3 of 12, or pdf 5/19) Reference 29, ML17220A234
87	3.4.7	161	4	In its response to PRA RAI 14 (Reference 11) and PRA RAI 03 (Reference 19), the licensee explained that from a sensitivity study, it determined the impact of SOKC to be very small, and therefore, was not included in the risk estimates.	Wrong reference	In its response to PRA RAI 14 (Reference 11 10) and PRA RAI 03 (Reference 19), the licensee explained that from a sensitivity study, it determined the impact of SOKC to be very small, and therefore, was not included in the risk estimates.	Reference 10 and ADAMS accession number ML15118A484
88	3.4.8	163	1st bullet	Accordingly, the CDF and LERF for both units above the risk acceptance guidelines of 1E05/year and 1E 6/year in RG 1.174, respectively.	The risk acceptance guideline for CDF is 1E-05, not 1E05. The conclusion statement is not clear.	Accordingly, the CDF for both units are above the risk acceptance guidelines of 1E-05/year and LERF is below the risk acceptance guidelines of 1E 06/year contained in RG 1.174.	(ADAMS Accession No. ML17177A097).
89	3.5.1.1	169	2	The licensee performed a detailed analysis of fire protection features and identified the fire suppression and detection systems required to meet the NSPC for each fire area.	Include passive fire protection features, as in Item 4) in the previous paragraph. Section 3.5.1.8 does not reference Table 4-3 listing of passive fire protection features.	The licensee performed a detailed analysis of fire protection features and identified the fire suppression and detection systems and passive fire protection features required to meet the NSPC for each fire area.	LAR
90	3.5.1.3	169	1	In LAR Section 4.2.3, the licensee stated that six licensing actions for Unit No. 1 and nine licensing actions for Unit No. 2 will be transitioned into the NFPA 805 FPP as previously approved.	This was supplemented in the updated Attachment K submitted in L-17-122 (ML17111A887) Enclosure B. In this updated Attachment K, there are six licensing actions for Unit No. 1 (11.02, 11.05, 11.16, 11.18, 11.24, 11.26) and eleven licensing actions for Unit 2 (3, 4, 5, 6, 8, 11, 18, 26, 29, 30, 31) that will be transitioned into the NFPA 805 FPP as previously approved.	In LAR Section 4.2.3, the licensee stated that six licensing actions for Unit No. 1 and eleven licensing actions for Unit No. 2 will be transitioned into the NFPA 805 FPP as previously approved.	Updated Attachment K L-17-122 (ML17111A887) Enclosure B

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
91	3.5.1.3 Table 3.5-2	171	LA 11.02 NRC Staff's Evaluation 4th paragraph	-	Missing a condition as bases for exemption approval. Add in.	Pressurizer PORV blocking valve power cables are run in conduit approximately 20 feet above the floor to the penetration area where they are separated by a fire barrier and automatic suppression and detection system.	Ref 18 ML17111A887 2017-04-21, Enclosure B, Att. K
92	3.5.1.3 Table 3.5-2	175	LA 11.16 NRC Staff's Evaluation 2nd paragraph	-	Missing a condition as bases for exemption approval. Add in.	Separation of approximately 5 feet is maintained between source range channels. Source range cables are in conduit.	Ref 18 ML17111A887 2017-04-21, Enclosure B, Att. K
93	3.5.1.3 Table 3.5-2	175	LA 11.16 NRC Staff's Evaluation 4th paragraph	In response to SSD RAI 06 (Reference 12), the licensee stated that Licensing Action 10 will not be transitioned.	Licensing Action number is incorrect and may be confused with BVPS-2	In response to SSD RAI 06 (Reference 12), the licensee stated that Licensing Action 11.10 will not be transitioned.	Ref 12 ML15177A110 2015-06-26
94	3.5.1.3 Table 3.5-2	176	LA 11.18 Applicable Fire Compartment	1-NS-1 1-PA-1A 1-PA-1C 1-PA-1E 1-PA-1G 1-PA-1GA 1-PA-1GB 1-PA-1GC 1-TB-1 3-CR-1 3-IS-1 3-IS-2 3-IS-3 3-IS-4	Corrected fire compartments	1-NS-1 1-PA-1A 1-PA-1C 1-PA-1E 1-PA-1G 1-PA-1GA 1-PA-1GB 1-PA-1GC 1-PT-1 1-SB-GEN 1-SGPD-1 1-TB-1 3-CR-1 3-IS-1 3-IS-2 3-IS-3 3-IS-4 3-IS-6	Ref 18 ML17111A887 2017-04-21, Enclosure B, Att. K
95	3.5.1.3 Table 3.5-2	186	LA 11 Applicable Fire Compartment	Not Applicable	Does not match the fire compartment in Licensing Action 11	Not Applicable 2-PA-4	Ref 18 ML17111A887 2017-04-21, Enclosure B, Att. K
96	3.5.1.3 Table 3.5-2	189	LA 26 NRC Staff's Evaluation 2nd Paragraph	The diesel generator supplies the 120V alternating current (AC) uninterruptible power supply system required for the detection system and the 25V direct current (DC) panels for the fire detection and suppression systems.	Typo	The diesel generator supplies the 120V alternating current (AC) uninterruptible power supply system required for the detection system and the 125V direct current (DC) panels for the fire detection and suppression systems.	Ref 18 ML17111A887 2017-04-21, Enclosure B, Att. K

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
97	3.5.1.3 Table 3.5-2	191	LA 30	Clarification Request 15: It is requested that the NRC document as a "prior approval" recognition that the absence of sprinkler protection in the intake structure compartment (3 IS 4) that houses the diesel fire pump is acceptable	Clarification Request 15 was withdrawn per SSD RAI 13(d) (L-15-188 ML15177A110) and FPE RAI 05(a)(viii) (L-15-118 ML15118A484). This is also discussed in section 3.5.2 (pg 203) of the SE.	Clarification Request 15: It is requested that the NRC document as a "prior approval" recognition that the absence of sprinkler protection in the intake structure compartment (3 IS 4) that houses the diesel fire pump is acceptable	SSD RAI 13(d) (L-15-188 ML15177A110); FPE RAI 05(a)(viii) (L-15-118 ML15118A484); SER Section 3.5.2 (pg 203)
98	3.5.1.3 Table 3.5-2	191	LA 30	Based on the previous staff approval of this deviation in SER dated June 6, 1979 (Reference 96), Clarification Request 15 , and the statement by the licensee that the bases remain valid, the NRC staff concludes that the applicability of this licensing action is acceptable.	Clarification Request 15 was withdrawn per SSD RAI 13(d) (L-15-188 ML15177A110) and FPE RAI 05(a)(viii) (L-15-118 ML15118A484). This is also discussed in section 3.5.2 (pg 203) of the SE.	Based on the previous staff approval of this deviation in SER dated June 6, 1979 (Reference 96), Clarification Request 15 , and the statement by the licensee that the bases remain valid, the NRC staff concludes that the applicability of this licensing action is acceptable.	SSD RAI 13(d) (L-15-188 ML15177A110); FPE RAI 05(a)(viii) (L-15-118 ML15118A484); SER Section 3.5.2 (pg 203)
99	3.5.1.3 Table 3.5-2	191	LA 30 Applicable Fire Compartment	3-IS-4	Other Intake Fire Compartments are also part of the LA	3-IS-1 3-IS-2 3-IS-3 3-IS-4	Ref 18 ML17111A887 2017-04-21, Enclosure B, Att. K
100	3.5.1.3	194	2	In its response to FPE RAI 04a and FPE RAI 04c (Reference 12), the licensee stated that LAR Attachment K, as supplemented, Licensing Action 27 is not required, and an engineering evaluation was performed that analyzed the low population of cables with potential nonqualified electric cable insulation material installed in electrical raceways and determined the configuration to be acceptable, and removed the compliance statement "Submit for NRC Approval." The NRC staff concludes that the licensee's response to FPE RAI 04a is acceptable because it performed an engineering evaluation and concluded that the cable is acceptable, which is in accordance with RG 1.205, NEI 04 02, and FAQ 06 0022	A follow-up RAI was issued regarding NFPA 805 Section 3.3.5.3 (FPE RAI 04.01 L-15-371 ML15356A136), with the response stating that approval will be requested as an Attachment L Item. The Attachment L Item was submitted as Approval Request 6. (L-16-058 ML16055A160). This should be updated to reflect the Approval Request, which is identified in SE Section 3.1.4.6 See SE pages 35/36 for same comment.	Replace with: In FPE RAI 04.01 (Reference 25), the NRC staff stated in the engineering evaluation, the licensee concluded that the low population of cables that do not meet Institute of Electrical and Electronics Engineers (IEEE) Standard 383, 1974 Edition, or equivalent, were considered in the fire modeling evaluation and determined to be adequate for the hazard. In accordance with FAQ 06-0008, this type of EEEE cannot be self-approved by the licensee. In its response to FPE RAI 04.01 (Reference 14), the licensee stated that the compliance strategy for NFPA 805 Section 3.3.5.3, for the low population of cables with potentially non-qualified electrical cable insulation material installed in electrical raceways at BVPS-1 and BVPS-2 will be revised to "Submit for NRC Approval."	FPE RAI 04.01 (L-15-371 ML15356A136); L-16-058 (ML16055A160); SER Section 3.1.4.6 (pg 90)

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
101	3.5.1.5	196	2	In LAR Attachment C, the licensee identified VFDR BV2-0502 in fire area 2-CV-1, which involves fire damage to power cables associated with high low pressure interface valves 2RHS-MV701A-P, 2RHS-MV701B-P, 2RHS-MV702A-P, and 2RHS-MOV702B-P. The licensee stated in the disposition that the VDR will be corrected by a plant modification.	Component ID for three of the four affected valves were transcribed incorrectly from LAR Attachment C. They should be: 2RHS-MOV701A-P 2RHS-MOV701B-P 2RHS-MOV702A-P 2RHS-MOV702B-P Typo: VFDR	In LAR Attachment C, the licensee identified VFDR BV2-0502 in fire area 2-CV-1, which involves fire damage to power cables associated with high low pressure interface valves 2RHS-MOV701A-P, 2RHS-MOV701B-P, 2RHS-MOV702A-P, and 2RHS-MOV702B-P. The licensee stated in the disposition that the VFDR will be corrected by a plant modification.	LAR Attachment C, Page 49 (VFDR BV2-0502).
102	3.5.1.6	197	2	The licensee stated that the generator fuel tank has a 4 gallon capacity, which will run the generator for about 4.2 hours, and that the available gasoline is enough to keep the generator running for about 15.75 hours. The licensee further stated that the gasoline engine driven fans used for the Beaver Valley, Unit No. 1, diesel generator rooms have a one quart fuel capacity, which will run the fan for about 1 hour; therefore, the available gasoline/oil mixture is enough to keep both fans running for about 10 hours.	excessive detail	the licensee demonstrated adequate reserves of fuel for sustainable operation of portable ventilation equipment during which time additional fuel could be obtained to replenish reserves.	N/A
103	3.5.1.7	199	2	... In its response to SSD RAI 04a (Reference 12), the licensee stated that the differentiation of RAs in LAR Attachment G, Tables G-1 and G-2, was defined and submitted as part of the licensee's response to PRA RAI 18b (Reference 22).	The licensee response for PRA RAI 18b is contained in Reference 11. The licensee response for PRA RAI 18b is not contained in Reference 22.	... In its response to SSD RAI 04a (Reference 12), the licensee stated that the differentiation of RAs in LAR Attachment G, Tables G-1 and G-2, was defined and submitted as part of the licensee's response to PRA RAI 18b (Reference 11).	Reference 9 and ADAMS accession number ML14002A086
104	3.5.1.7	199	2	The licensee further stated that the RAs would be updated in response to PRA RAI 03 (Reference 22), which is evaluated in SE Section 3.4.	The licensee response for PRA RAI 03 is contained in Reference 19. The licensee response for PRA RAI 03 is not contained in Reference 22.	The licensee further stated that the RAs would be updated in response to PRA RAI 03 (Reference 19), which is evaluated in SE Section 3.4.	Reference 9 and ADAMS accession number ML14002A086
105	3.5.2	201	2	In LAR Attachment T, Prior Approval Clarification Request 2, the licensee stated that the licensing submittals associated with Licensing Action 11.02 did not state that "all cables" are routed in conduit,...	Two licensing actions are dependent on the clarification in Attachment T, Clarification Request #2.	In LAR Attachment T, Prior Approval Clarification Request 2, the licensee stated that the licensing submittals associated with Licensing Action 11.02 and 11.16 did not state that "all cables" are routed in conduit,...	Reference 8, LAR Attachment T
106	3.5.2	202	2	The licensee submitted its revised LAR Attachment L including Approval Request 5 on February 24, 2016 (Reference 15).	Approval Request 5 was revised in a subsequent submittal.	The licensee submitted its revised LAR Attachment L including Approval Request 5 on February 24, 2016 (Reference 15) and an updated Approval Request 5 on May 12, 2016 (Reference 16).	Reference 16

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
107	3.5.2	202	3	"In its response to SSD RAI 13d (Reference 12), the licensee provided excerpts from NRC SER dated June 6, 1979 (Reference 96), a letter from Duquesne Light and Power to the NRC, and the Beaver Valley, Unit No. 2, NUREG 1057 SER (Reference 96), indicating that the fire pumps are located in the intake structure,..."	Reference points to BVPS-1 document rather than reference for BVPS-2	"In its response to SSD RAI 13d (Reference 12), the licensee provided excerpts from NRC SER dated June 6, 1979 (Reference 35), a letter from Duquesne Light and Power to the NRC, and the Beaver Valley, Unit No. 2, NUREG 1057 SER (Reference 96), indicating that the fire pumps are located in the intake structure,..."	Reference 35
108	3.5.3.3	207	6	"Pinch points refer to a particular location in an area where the damage from a single fire scenario could result in failure of multiple components or trains of a system such that the maximum detriment on that system's performance would be realized from the single fire scenario. Typically, this involves close vertical proximity of cables that support redundant components or trains of a system such that all such cables can be damaged by just one fire scenario."	This definition is not consistent with the definition stated in LAR Attachment D or LAR Section 4.3. LAR Section 4.3.1 defines a pinch point as: "plant locations where a single fire may damage all success paths of a KSF." Other locations in the LAR have slightly different, but consistent, wording. This definition is consistent with FAQ 07-0040, which states on Page 14 to "Identify locations where: 1. Fires may cause damage to the equipment (and cabling) credited above."	"Pinch points refer to plant locations where a single fire may damage all success paths of a KSF. a particular location in an area where the damage from a single fire scenario could result in failure of multiple components or trains of a system such that the maximum detriment on that system's performance would be realized from the single fire scenario. Typically, this involves close vertical proximity of cables that support redundant components or trains of a system such that all such cables can be damaged by just one fire scenario. "	LAR Section 4.3.1, Page 40. FAQ 07-0040 Revision 4, Section F.3, ADAMS Accession No. ML082070249.
109	3.7.2	214	1	...the licensee's monitoring program will meet the requirements specified in Sections 2.6.1, 2.6.2, and 2.6.3 of NFPA 805 ...	NFPA 805, Section 2.6 requires the monitoring program to "ensure that the assumptions in the engineering analysis remain valid" for those assumptions that are subject to change.	...the licensee's monitoring program will meet the requirements specified in Sections 2.6, 2.6.1, 2.6.2, and 2.6.3 of NFPA 805 ...	NFPA 805, Reference 3.
110	3.8.2	217	3	The LAR also stated that analyses based on the PRA program, which includes the FREs, are issued as formal analyses subject to these same configuration control processes, and are additionally subjected to the PRA peer review process specified in the ASME/ANS PRA standard (Reference 45).	Fire risk evaluations get an expert panel review, not necessarily a FPRA peer review.	The LAR also stated that analyses based on the PRA program, which includes the FREs, require the use of qualified individuals, procedures that require calculations be subject to independent review and verification, record retention, peer review, and a corrective action program that ensures appropriate actions are taken when errors are discovered.	Reference 8, LAR Section 4.7.2.

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
111	3.8.2.1	218	1	The licensee stated that its procedures require independent review of analyses, calculations, and evaluations, including those performed in support of compliance with 10 CFR 50.48(c). The LAR stated that the transition to NFPA 805 was independently reviewed, and that analyses, calculations, and evaluations to be performed post-transition will be independently reviewed, as required by existing procedures.	FPRA is performed consistent with the standard for internal events PRA, not with standards for Appendix B programs. The words in the draft SE are not stated in the LAR.	Replace with these words, "FENOC requires that the calculations and evaluations in support of NFPA 805, exclusive of the Fire PRA, be performed within the scope of the QA program, which requires independent review as defined by BVPS-1 and BVPS-2 procedures."	Reference 8, LAR Section 4.7.3
112	3.8.3.2.1	218	1	NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," Volumes 1-7 (Reference 57), documents the V&V of five selected fire models commonly used to support applications of RI/PB fire protection at NPPs. The seven volumes of this NUREG-series report provide technical...	NUREG-1824, Supplement 1 should also be referenced per Supplement LAR Attachment J	NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," Volumes 1-7 (Reference 57) and Supplement 1 to NUREG-1824 (Reference 165) documents the V&V of five selected fire models commonly used to support applications of RI/PB fire protection at NPPs. The seven volumes of this These NUREG-series reports provide technical...	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Supplemented LAR Attachment J
113	3.8.3.2.1	218	2	"Accordingly, for those FM elements performed by the licensee using the V&V applications contained in NUREG-1824 to support the transition to NFPA 805, the NRC staff concludes that the use of these models is acceptable, provided that the intended application is within the appropriate limitations of the model, as identified in NUREG-1824."	NUREG-1824, Supplement 1 should be referenced per Supplement LAR Attachment J	"Accordingly, for those FM elements performed by the licensee using the V&V applications contained in NUREG-1824, Supplement 1 to support the transition to NFPA 805, the NRC staff concludes that the use of these models is acceptable, provided that the intended application is within the appropriate limitations of the model, as identified in NUREG-1824, Supplement 1."	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Supplemented LAR Attachment J
114	3.8.3.2.1	218	3	In LAR Attachment J, as supplemented, the licensee identified the use of several empirical correlations that are not addressed in NUREG-1824 (see SE Section 3.4.2.3.1). The NRC staff reviewed these correlations, as well as the related material provided in the LAR, in order to determine whether the licensee adequately demonstrated alignment with specific portions of the applicable NUREG-1824 guidance.	NUREG-1824, Supplement 1 should be referenced per Supplement LAR Attachment J	In LAR Attachment J, as supplemented, the licensee identified the use of several empirical correlations that are not addressed in NUREG-1824, Supplement 1 (see SE Section 3.4.2.3.1). The NRC staff reviewed these correlations, as well as the related material provided in the LAR, in order to determine whether the licensee adequately demonstrated alignment with specific portions of the applicable NUREG-1824, Supplement 1 guidance.	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Supplemented LAR Attachment J
115	3.8.3.2.1	218	4	"The NRC staff concludes that the theoretical bases of the models and empirical correlations used in the FM calculations that were not addressed in NUREG-1824 were identified by the NRC staff and described in authoritative publications, peer reviewed journal articles or conference papers, or national research laboratory reports..."	NUREG-1824, Supplement 1 should be referenced per Supplement LAR Attachment J	"The NRC staff concludes that the theoretical bases of the models and empirical correlations used in the FM calculations that were not addressed in NUREG-1824, Supplement 1 were identified by the NRC staff and described in authoritative publications, peer reviewed journal articles or conference papers, or national research laboratory reports..."	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Supplemented LAR Attachment J

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
116	3.8.3.2.1	219	3	Based on the above, the NRC staff concludes that this approach provides reasonable assurance that the FM used in the development of the fire scenarios for the Beaver Valley FREs is appropriate, and thus, acceptable for use in transition to NFPA 805 because the V&V of the empirical correlations used by the licensee were consistent with either NUREG-1824, authoritative publications, peer reviewed journal articles, or national research laboratory reports.	NUREG-1824, Supplement 1 should be referenced per Supplement LAR Attachment J	Based on the above, the NRC staff concludes that this approach provides reasonable assurance that the FM used in the development of the fire scenarios for the Beaver Valley FREs is appropriate, and thus, acceptable for use in transition to NFPA 805 because the V&V of the empirical correlations used by the licensee were consistent with either NUREG-1824, Supplement 1 , authoritative publications, peer reviewed journal articles, or national research laboratory reports.	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Supplemented LAR Attachment J
117	3.8.3.2.2	219	1st bullet, 2nd paragraph	"The licensee further explained that the fuels and corresponding smoke properties in the areas where it applied the smoke detection actuation correlation are within the range of the materials that were tested to develop the temperature to smoke density correlation."	Add statement clarifying that NUREG-1824, Supplement 1 is now used as the V&V basis, per Supplement LAR Attachment J	"The licensee further explained that the fuels and corresponding smoke properties in the areas where it applied the smoke detection actuation correlation are within the range of the materials that were tested to develop the temperature to smoke density correlation. In the letter dated April 21, 2017 (Reference 18), the licensee identified that Alpert's ceiling jet correlation has been applied within the NUREG-1824, Supplement 1 (Reference 165) validated range or it provided technical justification in cases in which it used the correlation outside the range. "	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Supplemented LAR Attachment J
118	3.8.3.3.2	220	1st bullet, 2nd paragraph	In its response to FM RAI 04.a (Reference 12), the licensee stated that the limitations and assumptions associated with the algebraic models are documented in NUREG-1805 and NUREG-1824, and that in most cases, it applied the subject correlations within normalized parameter ranges summarized in NUREG-1934. The licensee further explained that in cases where it applied an algebraic model outside the validated range described in NUREG-1824, it justified its use, either by a qualitative assessment or by a quantitative sensitivity analysis.	Add statement clarifying that NUREG-1824, Supplement 1 is now used as the V&V basis, per Supplement LAR Attachment J. Per response to FM RAI 04.a, NUREG-1934 is used in reference to the validated ranges, not NUREG-1824.	In its response to FM RAI 04.a (Reference 12), the licensee stated that the limitations and assumptions associated with the algebraic models are documented in NUREG-1805 and NUREG-1824, and that in most cases, it applied the subject correlations within normalized parameter ranges summarized in NUREG-1934. The licensee further explained that in cases where it applied an algebraic model outside the validated range described in NUREG-1934, it justified its use, either by a qualitative assessment or by a quantitative sensitivity analysis. In the letter dated April 21, 2017 (Reference 18), the licensee identified that the algebraic models have been applied within the NUREG-1824, Supplement 1 (Reference 165) validated ranges or it provided technical justification in cases in which it used the algebraic models outside the range.	Licensee Response to RAIs dated 2015-06-26 (Reference 12 - ADAMS Accession No. ML15177A110), Page 56 Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Supplemented LAR Attachment J

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
119	3.8.3.3.2	221	2nd bullet, 2nd paragraph	"In its response to FM RAI 04.c (Reference 12), the licensee explained that the normalized parameters summarized in NUREG-1934 were calculated for each of the FDS analyses. The licensee further explained that in cases where the model was applied outside the validated range, it justified the use of the model either by a qualitative assessment or by a quantitative sensitivity analysis."	Since submittal of this RAI, FDS Version 6 was used in two analyses, which is validated by NUREG-1824, Supplement 1.	"In its response to FM RAI 04.c (Reference 12), the licensee explained that the normalized parameters summarized in NUREG-1934 were calculated for each of the FDS analyses. The licensee further explained that in cases where the model was applied outside the validated range, it justified the use of the model either by a qualitative assessment or by a quantitative sensitivity analysis. In the letter dated April 21, 2017 (Reference 18), the licensee identified that FDS Version 6 analyses have been applied within the NUREG-1824, Supplement 1 (Reference 165) validated ranges or it provided technical justification in cases in which it used the correlation outside the range. "	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Supplemented LAR Attachment J
120	3.8.3.4.2	223	2nd bullet	In FM RAI 05.d (Reference 22), the NRC staff requested that the licensee explain how it ensured consistency between the two contractors that were involved in the FM analyses performed in support of the LAR.	Three, not two, contractors performed fire modeling	In FM RAI 05.d (Reference 22), the NRC staff requested that the licensee explain how it ensured consistency among the contractors that were involved in the FM analyses performed in support of the LAR.	FM RAI 05.d
121	3.8.3.5.1	224	(2)	An extensive discussion of quantifying model uncertainty can be found in NUREG-1934, "Nuclear Power Plant Fire Modeling Application Guide (NPP FIRE MAG)" (Reference 61).	NUREG-1824, Supplement 1 is not listed as well. New analyses use NUREG-1824, Supplement 1 uncertainty.	An extensive discussion of quantifying model uncertainty can be found in NUREG-1934, "Nuclear Power Plant Fire Modeling Application Guide (NPP FIRE MAG)" (Reference 61) and NUREG-1824, Supplement 1, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," (Reference 165).	NUREG-1824, Supplement 1
122	3.8.3.5.2	226	12th sub-bullet	Cable trays with any amount of thermoplastic cable, regardless of percentage, were treated as thermoplastic for fire spread rate.	The approach has been refined to utilize the full guidance within NUREG/CR-7010 for scenarios where NUREG-2180 was applied.	Cable trays with a predominant-any amount of thermoplastic cable, regardless of percentage , were treated as thermoplastic for in accordance with NUREG/CR-7010 (i.e., FLASH-CAT) fire spread rate.	Draft SER, Att. A, pg A-10 NUREG/CR-7010, Section 9.2.2, pg 152 Reference 18, ML17111A887, 2017-04-21, Enclosure A, Page J-13

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
123	4.0	230	(c)2	-	Insert "[2]" after "Unit 1" in two places to note this license condition applies to both units.	The licensee shall implement the Unit 1 (2) modifications to its facility, as described in Attachment S, Table S 2, "Plant Modifications Committed," in FENOC letter L 17 122, dated April 21, 2017, to complete the transition to full compliance with 10 CFR 50.48(c), by the completion of the second Unit 1 and Unit 2 refueling outages, respectively, after issuance of the safety evaluation. The licensee shall maintain appropriate compensatory measures in place until completion of these modifications.	The license condition applies to both units.
124	4.0	230	(c)3	The licensee shall implement the items listed in Attachment S, Table S 3, "Implementation Items," of FENOC letter L 17 268, dated August 22, 2017, by 12 months after issuance of the safety evaluation	A statement needs added that the Table S-3 implementation items related to the FPRA model updates (BV1-1633, BV1-2974, BV1-3060, BV1-3108, BV1-3109, BV2-1580, BV2-1622, BV2-1623, and BV2-1750). This was described in L-17-122 (ML17111A887) "Table S-3 Implementation Item Changes" Note 1. Also, this was shown in the updated Attachment S, Table S-3, Note 1 (L-17-268 ML17235A512)	The licensee shall implement the items listed in Attachment S, Table S 3, "Implementation Items," of FENOC letter L 17 268, dated August 22, 2017, by 12 months after issuance of the safety evaluation (with the exception of Items BV1-1633, BV1-2974, BV1-3060, BV1-3108, BV1-3109, BV2-1580, BV2-1622, BV2-1623, and BV2-1750, which are to be completed in accordance with the Table S-2 Modifications Schedule."	L-17-122 (ML17111A887) "Table S-3 Implementation Item Changes" Note 1; Updated Attachment S, Table S-3, Note 1 (L-17-268 ML17235A512)
125	9.0	234	Reference 18	...(ADAMS Package Accession No. ML17111A882)."	Accession No. ML17111A882 is not found in ADAMS.	...(ADAMS Package Accession No. ML17111A887)."	Reference 18 and ADAMS accession number ML17111A887
126	9.0	245	Reference 153	"NBSIR 85-3196"	Reference has a minor typo	"NBSIR 85-3195"	NBSIR 85-3195, "Heat Release Rate Characteristics of Some Combustible Fuel Sources in Nuclear Power Plants"
127	Att. A	A-4	Row 2 Column 4	"The plume radius correlation is derived from Heskestad's plume centerline temperature correlation, for which V&V is documented in NUREG-1824. The plume radius correlation is subject to the same validated ranges."	NRC's Evaluation of Acceptability does not reference justifications for when plume radius is outside the validated range as mention in LAR Attachment J. It also should reference NUREG-1824, Supplement 1.	"The plume radius correlation is derived from Heskestad's plume centerline temperature correlation, for which V&V is documented in NUREG-1824, Supplement 1. The plume radius correlation is subject to the same validated ranges and justifications (See response to FM RAI 04.a (Reference 12))."	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887)
128	Att. A	A-6	Row 2 Column 4	"...the validated range reported in NUREG-1934, Supplement 1."	NRC's Evaluation of Acceptability should reference NUREG-1824, Supplement 1	"...the validated range reported in NUREG-1824, Supplement 1."	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887)

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
129	Att. A	A-9	Row 3	-	Obstructed Plume Radius V&V Basis is missing for SER Attachment A. V&V Basis for obstructed plume radius needs to be added as stated in See Page J-16 of LAR Attachment J as supplemented (i.e., Reference 18).	Add Following to SER Attachment A: " Obstructed Plume Radius "; " Correlation ," " Application of Beaver Valley, Unit No. 1 & Beaver Valley, Unit No. 2 ," " V&V Basis ," and " NRC Staff's Evaluation of Acceptability ."	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887), Page J-16 of Supplemented LAR Attachment J
130	Att. B	B-4	Row 2 Column 4	"...NUREG-1824..."	All references to NUREG-1824 in the evaluation of acceptability section should be NUREG-1824, Supplement 1	"...NUREG-1824, Supplement 1..."	Supplemental Information Regarding LAR (Reference 18 - ADAMS Accession No. ML17111A887)
131	Att. C	C-1	°C	-	degrees Celsius (°C) is defined in 3.4.2.2, but it is not listed in the abbreviation table	Add °C degrees Celsius	draft SE, page 136
132	Att. C	C-1	AC	-	AC (alternating current) is not listed in the abbreviations list	Add AC alternating current	draft SE, page 189
133	Att. C	C-1	ASME	ASME American Society for Testing and Materials	Incorrect acronym definition	ASME American Society of Mechanical Engineers	N/A
134	Att. C	C-1	BVPS	-	Acronym BVPS and definition are missing from Attachment C.	BVPS Beaver Valley Power Station	Draft SER Page 232 and 241
135	Att. C	C-1	CVCS	-	chemical volume control system (CVCS) is defined in 3.2.2, but it is not listed in the abbreviation table	Add CVCS chemical volume control system	draft SE, page 115
136	Att. C	C-1	DWST	-	demineralized water storage tank (DWST) is defined in in 3.2.2, but it is not listed in the abbreviation table	Add DWST demineralized water storage tank	draft SE, page 114
137	Att. C	C-1	ERF	-	emergency response facility (ERF) is defined in 3.1.1.6, but it is not in the abbreviation table	Add ERF emergency response facility	draft SE, page 63
138	Att. C	C-1	FMDB	FMDB Fire modeling database	Acronym FMDB is not used in the SER, however, FMWB is used on page 144 and throughout Att. A of the draft SER	FMWB Fire Modeling Workbook	Draft SER Page 144 and Att. A.
139	Att. C	C-1	FPEE	-	fire protection engineering evaluation (FPEE) is listed in Table 2.3-1, but it is not in the abbreviation table	add FPEE fire protection engineering evaluation	draft SE, page 144
140	Att. C	C-1	GPM	-	gallons per minute (gpm) is listed in Table 3.5-2, but not in the abbreviation table	Add gpm gallons per minute	draft SE, page 190
141	Att. C	C-2	HRRPUA	-	Acronym HRRPUA and definition are missing from Attachment C.	HRRPUA heat release rate per unit area	Draft SER Page 146
142	Att. C	C-2	IA	-	3.4.3 lists instrument air (IA), but it's n	add IA instrument air	draft SE, page 157
143	Att. C	C-2	POS	-	Plant Operating State (POS) is in 3.5.3.1, but it is not in the abbreviation list	Add POS Plant Operating State	draft SE, page 206

**Beaver Valley Units 1 and 2
Draft SER Compiled Comments**

A	B	C	D	E	F	G	H
	2017-11-09 Draft SE Section No.	2017-11-09 Draft SE Page No.	Paragraph No.	2017-11-09 Draft SE Statement	Comment	Proposed Revised Statement	References
144	Att. C	C-2	PPDWST	-	primary plant demineralized water storage tank (PPDWST) is in 3.2.2, but not in the abbreviation list	Add PPDWST primary plant demineralized water storage tank	draft SE, Page 114
145	Att. C	C-2	PPE	-	personal protective equipment (PPE) is in 3.2.5, but not in abbreviation list	Add PPE personal protective equipment	draft SE, page 121
146	Att. C	C-3	RW/SW	-	RW/SW is written in 3.2.2, but it is not in the abbreviation list and is not defined in the text	add RW/SW river water/service water	
147	Att. C	C-3	SG	-	steam generator (SG) is in 3.2.1.3, but it is not in the abbreviation list	add SG steam generator	draft SE, page 77
148	Att. C	C-3	SOFC	SOFC state-of-knowledge correlation	Incorrect acronym definition	SOKC state-of-knowledge correlation	Draft SER Pages 139 and 161
149	Att. C	C-3	VDC	ventilation duct chase	VDC is listed as ventilation duct chase in the abbreviation list, but it looks like it should be V DC (Volts DC)	Volts Direct Current	