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Mr. Michael T. Lesar, Chief  
Rulemaking and Directives Branch (RDB)  
Division of Administrative Services  
Office of Administration  
Mail Stop TWB-05-B01M  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

(4)

Subject: Comments Concerning Draft NUREG-1924, "Electric Raceway Fire Barrier Systems (ERFBS) in Nuclear Power Plants," dated September 2009 (Federal Register Notice 74FR51621, dated October 7, 2009)

Exelon Generation Company, LLC (Exelon) is submitting this letter in response to a request from the U.S. Nuclear Regulatory Commission (NRC) for comments concerning the subject draft NUREG document.

NUREG-1924 documents the history of the Electric Raceway Fire Barrier Systems (ERFBS) and how nuclear power plants use ERFBS for compliance. The NUREG also documents the current state of the use of these barriers and evaluates the effectiveness of these barriers in achieving adequate protection for nuclear power plants.

Exelon appreciates the opportunity to comment on draft NUREG-1924 and offers the attached comments for consideration by the NRC.

In addition, Exelon supports the comments submitted by the Nuclear Energy Institute (NEI) on behalf of the industry related to this draft NUREG document.

If you have any questions or require additional information, please do not hesitate to contact Mr. Christopher Pragman at 610-765-5682.

Respectfully,



David P. Helker  
Manager - Licensing

Attachment

SUNSI Review Complete  
Template = ADM-013

E-RIDS = ADM-03  
Add: G. Taylor (gj+)

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Electric Raceway Fire Barrier Systems (ERFBS) for Nuclear Power Plants

NUREG Section	Page	Comment
Introduction	1-1	<p>In the second paragraph of this section, the NRC makes reference to <i>“protective cables.”</i> Exelon recommends that this phrase be changed to read: <i>“protective cables and/or equipment.”</i> This paragraph also includes the statement: <i>“The authors of Appendix R envisioned classical fire walls being installed to separate or protect these cables.”</i> Exelon is not aware of any documented information in the rulemaking record of Appendix R suggesting that <i>“classical fire-rated walls”</i> were the only option being considered by the NRC in 1980. Therefore, Exelon is requesting further clarification concerning the NRC’s basis for this statement.</p>
Table 1-1	1-2	<p>The table includes a reference to <i>“Braidwood 1 and 2.”</i> The information currently listed for Braidwood in the table indicates the use of <i>“Darmatt.”</i> Braidwood currently credits <i>“3M Interam”</i> installations only. Therefore, this table should be revised to indicate that Braidwood uses <i>“3M Interam”</i> and not <i>“Darmatt”</i> installations.</p>
Table 1-1 (continued)	1-3	<p>The information listed in the table for <i>“LaSalle 1 and 2”</i> and <i>“Oyster Creek”</i> should be updated to include a reference for the use <i>“Kaowool”</i> at LaSalle and <i>“3M Interim”</i> at Oyster Creek. These materials are also used along with those currently listed in the table for LaSalle and Oyster Creek.</p>
Section 3, ERFBS Regulation	3-1	<p>Exelon recommends that the NRC consider including additional discussion related to post-1979 licensing requirements in order to avoid the possible perception that the criteria in Section III.G.2 of Appendix R are the only requirements that are applicable to all licensees.</p> <p>This section frequently intermixes contemporary NRC positions and information with historical positions and information, without providing a clear reference to the timeframe. Exelon believes that for the most part, licensees installed their fire barriers to the NRC guidance that was in effect at that time. NRC guidance subsequently changed over time. Therefore, Exelon recommends that the NRC consider including additional clarification and discussion regarding changes in NRC guidance that occurred over time.</p> <p>In the last paragraph on this page, the NRC makes the statement: <i>“The new regulations imposed a minimum set of fire protection program and post-fire safe shutdown requirements.”</i> Exelon recommends clarifying this statement to specify that it applies to plants licensed to operate prior to January 1, 1979.</p>

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Section 3, ERFBS Regulation (continued)	3-2	<p>In the third paragraph on this page, the NRC states that: <i>"In addition, all plants to receive their operating license after January 1, 1979, have license condition that satisfy specific requirements of Appendix R, including III.G for redundant trains located in a fire area."</i> Exelon believes that most post-1979 plants do not have a license condition similar to that described in this statement. Exelon understands that the NRC has indicated that for plants licensed after January 1, 1979, Branch Technical Position (BTP) ASB 9.5-1 provides an adequate level of safety in the fire protection area, and compliance with Appendix R is not required. [Refer to the NRC Commission Meeting and Vote on Appendix R - October 16, 1980 transcript, page 5.] Therefore, Exelon is requesting further clarification concerning the NRC's statement regarding compliance with Appendix R.</p> <p>In addition, this statement seems to include grammatical and typographical errors (e.g., the word <i>"additional"</i> should be <i>"addition"</i>).</p>
Section 4, Testing Criteria	4-1	<p>In the first paragraph on this page the NRC makes the statement: <i>"...there were no established tests for ERFBS that were found acceptable to NRC."</i> Exelon requests further clarification regarding the basis for this statement. Exelon does not believe that sufficient NRC guidance was made available as to what tests are considered acceptable. Both NRC BTP ASB 9.5.1 and Regulatory Guide (RG) 1.120 stated that: <i>"The Nuclear Energy Liability and Property Insurance Association (NELPIA) and the Mutual Atomic Energy Reinsurance Pool (MAERP) have prepared a document entitled 'Specifications for Fire Protection of New Plants,' which gives general conditions and valuable criteria."</i> This information would seem to convey that guidance was available. Exelon is not aware of any NRC generic communications from the 1980 to 1986 timeframe indicating that the NRC found American Nuclear Insurers (ANI) protocol unacceptable. Exelon believes that some plants licensed in this timeframe indicate in their Updated Final safety Analysis Reports (UFSARs) that fire barrier qualifications have been performed in accordance with ANI NEL-PIA/MAERP test standards, and these plants' UFSARs have been accepted and operating licenses were granted.</p> <p>In the fifth paragraph on this page, the NRC makes the statement that: <i>"...ANI standard was the only method for testing ERFBS and was designed for insurance purposes only."</i> As stated previously, both NRC BTP ASB 9.5.1 and RG 1.120 stated that: <i>"The Nuclear Energy Liability and Property Insurance Association (NELPIA) and the Mutual Atomic Energy Reinsurance Pool (MAERP) have prepared a document entitled 'Specifications for Fire Protection of New</i></p>

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		<p><i>Plants,' which gives general conditions and valuable criteria."</i> Exelon believes that this would seem to convey that guidance was available. Therefore, Exelon requests further clarification regarding the basis for the statement in the draft NUREG.</p> <p>This paragraph also makes the statement that: <i>"The ANI standard, as discussed below, has its deficiencies and is not considered to be an acceptable method to NRC staff for qualifying ERFBS."</i> Exelon is not aware that this information was ever formally communicated to the industry prior to 1986. In addition, Exelon does not believe that this NRC position was retroactive. Therefore, Exelon requests further clarification concerning this statement.</p>
Section 4, Testing Criteria (continued)	4-2	<p>In the first paragraph on this page the NRC makes references to the ANI standard being developed for "insurance purpose only." As previously discussed, both NRC BTP ASB 9.5.1 and RG 1.120 state that: <i>"The Nuclear Energy Liability and Property Insurance Association (NELPIA) and the Mutual Atomic Energy Reinsurance Pool (MAERP) have prepared a document entitled 'Specifications for Fire Protection of New Plants,' which gives general conditions and valuable criteria."</i> As previously indicated, Exelon believes that this would seem to convey that guidance was available, and therefore, Exelon is requesting further clarification.</p> <p>In the second paragraph on this page, the NRC makes the statement that: <i>"This supplement provided the acceptance criteria that were satisfactory to NRC for qualifying an ERFBS fire rating. Supplement 1 to GL 86-10, also included performance based criteria based on the type of cable, and other factors to achieve an acceptable barrier without meeting the prescriptive test limits."</i> Exelon does not believe that this Generic Letter (GL) 86-10 "supplement" was considered retroactive. Therefore, Exelon is requesting further clarification concerning this issue.</p>
Section 4, Testing Criteria (continued)	4-3	<p>In the second paragraph on this page, the NRC makes reference to <i>"NFPA 251."</i> Prior to issuance of GL 86-10, Exelon was not aware of the NRC's position regarding the use NFPA 251. Therefore, Exelon is requesting further clarification concerning the NRC's position and timing related to the use of NFPA 251.</p> <p>In Section 4.3 on this page, the NRC makes the statement that: <i>"In these guidance documents, NRC staff stated that as a minimum, the design of fire barriers for horizontal and vertical cable</i></p>

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		<p>trays should meet the requirements of the American Standard ASTM E-119, "Fire of Building Construction and Materials," including the hose stream test. NRC also stated in GL 86-10 Supplement 1 that the acceptance criteria contained in NFPA 251, "Standard Methods of Fire Tests of Building Construction and Materials," pertaining to nonbearing fire barriers was applicable to cable-tray fire barrier wraps. Figure 4-1 shows a logic diagram for the qualification and acceptance criteria for ERFBS that was provided in Supplement 1 to GL 86-10." Exelon requests further clarification. Exelon understands that in each edition of the BTP, the NRC indicated that ASTM E-119 should apply to penetration seals, not cable-tray wraps.</p>
Figure 4.1	4-4	<p>Exelon believes that this figure is confusing and the NRC should consider including additional clarification. There is a box that specifies "NRC Review." A review by the NRC is something that is not normally performed and Exelon is unclear as to the NRC's intent. Therefore, additional clarification would be helpful.</p>
Section 4.3.2, ASTM E-119 and NFPA 251	4-5	<p>In the second paragraph on this page, the NRC makes reference to "ASTM 251." Exelon believes that this is a typographical error and the reference should be "NFPA 251."</p>
Section 5.1, Thermo-Lag	5-3	<p>In the fourth, fifth, and sixth paragraphs on this page, the NRC identifies specific values/measurements. Exelon believes that the values presented in this section could be construed to mean the related construction details are NRC-approved or are somehow binding on a licensee. Therefore, Exelon is requesting further clarification and questions whether it is necessary to reference these specific values/measurements.</p>
Section 5.1.1	5.5	<p>In the third paragraph on this page, the NRC makes the statement that: "NRC's concerns regarding Thermo-Lag 330-1 ERFBS began after they received licensee event reports (LERs) from Gulf States Utilities (GSU) citing failed qualification fire tests and installation problems." In the context of the previous paragraph, which indicates that all this occurred in "a few short years," Exelon requests that the NRC consider including dates concerning these notifications/reports.</p>
Table 5-1	5-8	<p>Exelon requests further clarification whether it s necessary for the NRC to recreate this table since similar and more detailed information is provided in ML041120065.</p> <p>This table includes information about "Three Mile Island Unit 1." Exelon considers the</p>

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		information depicted for Three Mile Island Unit 1 (TMI-1) in the columns labeled "Confirmatory Order" and "Order Completion" to be incomplete since it does not reflect information included in final transmittals on the subject. TMI-1 information should also include a Confirmatory Order dated August 11, 1999 (ML003766024) and Completion Letter dated March 12, 2000 (ML003693928). [Refer to ML003732407 for a complete listing.]
Section 5.1.2, Problems	5-9	In the third paragraph on this page, the NRC makes a statement that: <i>"Review of a number of these reports disclosed that the TSI tests had not been performed in accordance with the required standards."</i> Exelon believes that as written, this paragraph may intermix events that occurred in 1981 with events that occurred in 1992. The NRC received test reports in 1981 and found fault with the reports in 1992. The NRC position did not require <i>"full scale"</i> tests until GL 86-10, Supplement 1, was issued. Therefore, Exelon believes that further clarification or explanation might be helpful.
Section 5.1.2, Problems (continued)	5-10	In the third paragraph on this page, the word <i>"params"</i> seems to be a typographical error and the NRC should consider revising the word accordingly.
Section 5.1.2, Problems (continued)	5-11	<p>Under the section titled <i>"Bounding Plant Installations,"</i> the NRC makes a statement that: <i>"...fire rating such as an Underwriters Laboratories, Incorporated (UL) Listing or testing conducted by a nationally recognized testing laboratory...."</i> Prior to NRC issuance of Information Notice 84-09, there was no specific NRC guidance indicating that fire barriers (e.g., walls, floor, ceilings, wraps) are subject to testing by Underwriters Laboratory (UL) or nationally recognized testing laboratories. BTP 9.5-1 required this for doors, but not fire barriers. Therefore, Exelon is requesting further clarification concerning the basis for this statement. In addition, this paragraph uses the word <i>"reviewed"</i> in the fourth line. Exelon believes this to be a typographical error and the word should be revised from <i>"reviewed"</i> to <i>"review."</i></p> <p>Under the section titled <i>"Combustibility,"</i> the NRC uses the word <i>"form"</i> in the last line. Exelon believes this to be a typographical error and the word should be revised from <i>"form"</i> to <i>"from."</i></p>
Section 5.1.2, Problems (Continued)	5-12	In the first paragraph on this page, the NRC makes a statement that: <i>"...as required by a nationally recognized testing laboratory and that the vendor had falsified the test reports."</i> As stated previously, prior to NRC issuance of Information Notice 84-09, there was no specific NRC guidance indicating that fire barriers (e.g., walls, floor, ceilings, wraps) are subject to

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		testing by UL or nationally recognized testing laboratories. BTP 9.5-1 required this for doors, but not fire barriers. Therefore, Exelon is requesting further clarification concerning the basis for this statement.
Section 5.2, 3M Interam™ E-50 Series & Rigid Panel System	5-23	The second paragraph states: "...the stainless steel E-50C barrier did experience a slightly higher internal temperature at the 1-hour time period (approximately 12°C, (10°F) higher)." A difference of 12 degrees C would equate to 21.6 degrees F. A difference of 10 degrees F would equate to 5.56 degrees C. Therefore, Exelon believes that the conversion identified in the NUREG is possibly incorrect and should be revised accordingly.
Section 5.2, 3M Interam™ E-50 Series & Rigid Panel System (continued)	5-24	In the third paragraph on this page the NRC states that: "...CS-195 will combust if exposed to a heat source that raises its temperature above the materials auto (or pilot with pilot present) ignition temperature. As a result, this material CS-195 should be used in containment unprotected." Exelon is requesting further clarification whether it was the NRC's intent to stipulate that the material should <u>not</u> be used in containment unprotected.
Table 5.5	5-27	Exelon believes that Table 5-5. "3M Design Comparison Old-to-New," appears to contain mathematical errors. Specifically, E-53A is 0.3 inches thick and E-54A is 0.4 inches thick. Four layers of E-54A would equal 1.6 inches, not 1.2 inches as indicated. Five layers of E-54A would equal 2.0 inches, five layers of E-53A would equal 1.5 inches and not 2.0 inches as depicted. Therefore, Exelon is requesting further clarification regarding the values shown in the table.
Section 5.4.1, History	5-48	In the second paragraph on this page, the NRC uses the word "will" in the second to last line. Exelon believes this to be a typographical error and the word should be revised from "will" to "wall."
Section 5.6.4, Resolution & Staff Conclusion	5-79	In the first paragraph on this page under Section 5.6.4, the NRC uses the word "along" in the second line. Exelon believes this to be a typographical error and the word should be revised from "along" to "alone."
Section 6.6, Byron Station	6-3	In the last paragraph on this page under Section 6.6, there appears to be a typographical error on the third line. Specifically, words appear to be missing from a sentence. Exelon suggests that the existing phrase "...dated January 17, 1997, t, included; 1) re-analysis..." in the third

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		line be revised to read: "...dated January 17, 1997, three methods of resolution were utilized, which included; 1) re-analysis...."
Section 6.6, Byron Station (continued)	6-4	In the first paragraph on this page, the NRC uses the word "he" at the end of the second line. Exelon believes this to be a typographical error and the word should be revised from "he" to "The."
Section 6.10, Clinton	6-5	<p>In the first paragraph under Section 6.10, the NRC makes a statement that: "<i>Clinton Power Station utilizes 167 m (547 linear feet) of 1-hour Thermo-Lag 330-1 cable tray fire barriers and 45 m 149 linear feet) of 3-hour fire barriers at 10 different locations throughout the plant. In addition, CPS uses 34 m (112 linear feet) of 1-hour conduit fire barriers and 31 m (103 linear feet) of 3-hour conduit fire barriers.</i>" Exelon considers the information as written to be out-of-date. Clinton Power Station originally used the amounts listed in the second sentence (i.e., 547 linear feet and 149 linear feet). These values were documented in an Exelon letter cited below which is not currently referenced in the draft NUREG. [reference <i>Letter from J.S. Perry (Clinton Power Station) to S.A. Varga (U.S. NRC), "Illinois Power's Response to the Nuclear Regulatory Commissions Request for Additional Information Regarding Generic Letter 92-09, 'Thermo-Lag 330-1 Fire Barriers'" letter U-602250, L30-94(02-09)LP, dated February 9, 1994.</i>]</p> <p>However, Clinton Power Station has eliminated dependence on Thermo-Lag as a credited fire barrier through several different methods including: modification of the existing design to provide divisional separation through rerouting of cables/conduits, installation of other barrier designs, or development of deviations. Therefore, Exelon requests that the NRC update this section for Clinton accordingly.</p>
Section 6.32, Limerick Generating Station & Peach Bottom Atomic Power Station	6-15	In the top paragraph on this page, the NRC makes the statement that: "...but Thermo-Lag isn't used for physical independence (RG 1.75). One hour and 3-hour Thermo-lag installations are used at both sites accounting for approximately 1341 m (4,400 feet) of Thermo-Lag at each station." Exelon does not believe that this statement is correct as it applies to Limerick Generating Station. The cable tray installation specification allowed the use of installed Thermo-Lag in place of metal tray covers when minimum physical electrical separation distances could not be maintained. In these instances the Thermo-Lag serves a dual purpose as a fire barrier and an electrical separation barrier. Exelon communicated this information to the NRC in a response to GL 92-08 (i.e., PECO to NRC, Response to RAI, letter dated



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		<p>February 4, 1994, Refer to Item 1.c. - (NUREG report Reference 214)). This letter indicated the following: <i>“PECO performed physical testing to validate that Thermo-Lag 330-1 and Darmatt KM-1 raceway encapsulations are acceptable without tray covers to limit the spread of electrical damage to adjacent cables/raceway, as required for reduced separation applications at LGS, Units 1 and 2, per UFSAR commitments regarding Regulatory Guide 1.75 - 1978, Physical Independence of Electrical System and IEEE 384 - 1974, IEEE Standard Criteria for Independence of Class IE Equipment and Circuits.</i></p> <p><i>The evaluation is applicable to Thermo-Lag 330-1 (original 1-hour and 3-hour), Thermo-Lag (updated 3-hour), and Darmatt KM-1 raceway encapsulation for 1-hour and 3-hour ratings. Reference 99-00218 Engineering Analysis LEAF-0013, Thermo-Lag 330-1 and Darmatt KM-1 Encapsulation for RG 1.75 separation.”</i></p> <p>The length/measurement referenced in this statement is for Peach Bottom only. Therefore, Exelon is requesting that the values shown either be omitted or if the length is needed, the sum of the listed amounts for the 1-hour and 3-hour barriers documented in the response to GL 92-08 (i.e., PECO to NRC, Response to RAI, Letter dated February 4, 1994, Appendix 1 - (NUREG report Reference 214)) should be used to provide an accurate length for Limerick.</p>
Section 7, Summary of Findings	7-1	<p>Item 1 on this page states that: <i>“Use of ERFBS in NPPs is a direct result of the 1975 Brown Ferry Fire and the subsequent NRC fire protection regulations. The rush for NPPs to achieve compliance with the new regulation and wide use of ERFBS resulted in problems with proper testing, design, installation, maintenance, and ability of the barrier to perform its desired function.”</i> Exelon believes that in addition to the items stated here, an additional contributing factor to historical problems with ERFBS appears to be that detailed expectations/guidance regarding ERFBS qualification were not developed until well after most plants had completed their ERFBS installations. Therefore, Exelon is requesting that the NRC consider including this information as a possible contributing factor.</p>
Appendix F	F-1	<p>With regard to the information presented on this page of the table for <i>“Braidwood 1 and 2,” “Byron 1 and 2,” “Clinton,”</i> and <i>“Dresden 2 and 3,”</i> Exelon does not plan to transition to 10CFR50.48(c) at this time.</p>

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Appendix F (continued)	F-2	With regard to the information presented on this page of the table for " <i>LaSalle 1 and 2,</i> " and " <i>Limerick 1 and 2,</i> " Exelon does not plan to transition to 10CFR50.48(c) at this time. In addition, LaSalle Unit 1 uses Darmatt and Kaowool. The Reactor Building elevation 740' has the Kaowool wrap as described on page 6-14 of the draft NUREG. LaSalle Unit 2 uses Darmatt and Kaowool fire barriers and Darmatt was installed as a replacement for Thermo-Lag. This is described in ML061640343. Therefore, Exelon recommends that the information in the table for LaSalle be updated accordingly.
Appendix F (continued)	F-3	With regard to the information presented on this page of the table for " <i>Oyster Creek,</i> " " <i>Peach Bottom 2 and 3,</i> " and " <i>Quad Cities 1 and 2,</i> " Exelon does not plan to transition to 10CFR50.48(c) at this time. In addition, Oyster Creek currently uses Thermo-Lag, Mecatiss, and 3M Interam. 3M Interam was added after completion of Thermo-Lag resolution actions. Therefore, Exelon recommends that the information in the table for Oyster Creek be updated accordingly.
Appendix F (continued)	F-4	With regard to the information presented on this page of the table for " <i>Three Mile Island 1,</i> " Exelon does not plan to transition to 10CFR50.48(c) at this time.
Appendix G	G-1	Exelon believes that a citation would be helpful in the draft NUREG related to the first paragraph on this page under Section G.1, " <i>UL Subject 1724.</i> " The NRC performed a review of the UL Standard 1724 and forwarded comments to UL regarding the standard. Therefore, Exelon recommends that the NRC consider adding a citation related to this correspondence in the NUREG.