May 14, 2004

Mr. Alexander Marion
Director Engineering
Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, D.C. 20006-3708

SUBJECT: NRC Comments on Revision E of NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c)"

Dear Mr. Marion:

Your letter of April 5, 2004, (ML040970013) submitted Revision E of Nuclear Energy Institute's (NEI) proposed guide document, NEI 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c)", for NRC review and comment. During our meeting at NRC headquarters on April 30, 2004, we discussed specific aspects of the subject guidance document for which we needed clarification and provided our editorial comments on the document for your use. Attached are our remaining comments for your use in preparing the final document.

We commend you for the effort spent thus far to develop this guidance document and recognize the considerable improvements provided by the latest revision. The enclosed comments are intended to further enhance NEI 04-02 such that it provides clear and concise guidance to licensees with respect to the adoption of NFPA 805 in accordance with the final rule and the associated change process. Incorporation of our comments will clarify regulatory requirements and facilitate the review of fire protection license amendment requests and the conduct of inspections.

In order to expedite our review of NEI's incorporation of our comments, please provide an item-by-item response to the enclosed comments. Following your receipt of this letter and assessment of the impact of our comments, please contact us so that we can arrange for a meeting to discuss the comments, if needed, and the schedule for the revision to NEI 04-02. The schedule for development of the regulatory guide that will endorse NEI 04-02 is very aggressive and the regulatory guide is currently being drafted. Consequently, satisfactory resolution of our comments and re-issuance of NEI 04-02 in the near term is important to the timely completion of this program.

If you have any questions regarding this letter, please contact Paul Lain on (301) 415-2346.

Sincerely,

John N. Hannon, Chief **//RA//**
Plant Systems Branch
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

Enclosure: NRC Comments on NEI 04-02

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John N. Hannon, Chief **//RA//**
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NRC COMMENTS ON NEI 04-02

SUBSTANTIAL COMMENTS ON NEI 04-02

1. There are a number of references to NEI 00-01 in NEI 04-02. The NRC is currently evaluating the guidance provided in NEI 00-01 and may not necessarily endorse NEI 00-01 in its entirety. Pending resolution of this issue, we suggest that NEI 04-02 make reference to "NRC approved methods" rather than to NEI 00-01.

2. NEI 04-02 contains references to the appendices of NFPA 805. It should be noted in NEI 04-02 that the NRC, in general, does not endorse the NFPA 805 appendices, since they are not part of the requirements of NFPA 805, but "included for informational purposes only". The NRC will be evaluating whether to endorse specific guidance provided in the NFPA 805 appendices and will include any specific endorsements in the proposed new regulatory guide currently being drafted.

3. NEI should delete every reference where NEI 04-02 makes a value judgement on what should be acceptable to the NRC. For example, page 47 provides an acceptance criteria. NEI does not define what is acceptable - they can quote, reference, or paraphrase our guidance or requirements, but not state what the criteria are for granting a license amendment.

4. It would be very helpful if there was an analysis (cross-walk document) that describes how each relevant requirement of NFPA 805 is addressed in each of the processes described in the guidance document.

5. The guidance document does not have a process with respect to evaluating post-transition changes to the FPP under NFPA 805 Section 2.2.9. Chapter 4 addresses initial transition changes and references Appendix I in Section 4.4. Appendix I is unclear regarding the change control process to be used beyond the transition process. Chapter 5 does not describe FPP change evaluation processes and their relationship to the licensee's FPP maintenance or configuration control processes.

6. The guidance document addresses both plant change evaluations (NFPA 805 2.2.9) and performance-based fire risk evaluation (NFPA 805 4.2.4.2). The two evaluations are similar comparative evaluations that involve an integrated assessment of risk, DID and margin against a baseline. However, the evaluations involve different scopes, comparison baselines, and uses. Therefore, they should be handled differently.

7. Each change to the FPP must be evaluated with respect the criteria of NFPA 805 2.2.9. For changes that involve the use of a performance based method to demonstrate that nuclear safety performance criteria is met, the change must meet NFPA 805 4.2.1 related to ensuring one success path is free of fire damage. With respect to Figure 4-4 on page 38 (and related text in the guidance document), it isn't clear how a risk evaluation (an element of NFPA 805 2.2.9) is addressed for changes that go through the "Initial Fire Modeling" branch that do not proceed through the "Combined Analysis" branch. Also, it isn't clear how the requirement of NFPA 805 4.2.1 is addressed for changes that go through the "Initial Risk Assessment" branch that do not proceed through the "Combined Analysis" branch. It should not be possible to accept a plant change using a performance-based approach that does not maintain one train free of fire damage.

8. Appendix I Section 1.3 excludes Chapter 3 Fundamental Program Elements and Minimum Design Requirements from the scope of "plant change evaluations." However, such changes are allowed under the rule using a license amendment. The requirement to use the license amendment process does not preclude the need to demonstrate that NFPA 805 2.2.9 criteria have been addressed. Accordingly, since a comprehensive change process addresses the performance of NFPA 805 2.2.9 evaluations, it isn't clear why changes to Chapter 3-related elements of FPP are excluded from the change process.

9. The guidance document does not provide significant guidance with regard to the development of the design basis documentation required by NFPA 805 2.7.1.2, nor do the processes described in the guidance document describe how this document is used in implementing NFPA 805 requirements. The design basis documentation will be useful in performing Plant Change Evaluations (NFPA 805 2.2.9) and audits of NFPA implementation. Guidance should be developed that will ensure development of design basis documentation that is useful for these purposes.

10. NEI 04-02 should note that although the "recovery actions" mentioned in NFPA 805 include repairs, "operator manual actions" permitted by the NRC exclude repairs. NEI 04-02 should refer to NRC guidelines for operator manual actions to be provided in a future Regulatory Guide 1.189, "Fire Protection for Operating Nuclear Power Plants".

COMMENTS ON NEI 04-02

General — Licensing basis terminology. Multiple terms and phrases are used to describe a plant's existing fire protection licensing basis and the new fire protection licensing basis per 10 CFR 50.48(c). NEI 04-02 should be revised to provide consistency in the use of terminology to minimize confusion of the user.

Recommend that two terms/phrases be used consistently throughout the document to clearly differentiate licensing basis discussions. These recommended terms/phrases are: 1) "pre-transition fire protection licensing basis"; and 2) "NFPA 805 licensing basis".

A similar condition exists with regard to statements referencing Appendix R, NUREG-0800, and or the standard license condition when discussing the current regulatory basis for plant fire protection programs. There is a multitude of fire protection licensing bases for nuclear power plants and these reference styles over-simplify the regulatory/licensing basis that exist for plant fire protection programs. In most, if not all cases, these references can be deleted as superfluous text or replaced with "pre-transition fire protection licensing basis" (or similar words - see recommendation in paragraph above). This approach makes the fire protection regulatory and licensing basis discussion in NEI 04-02 generic and leaves it to the plant personnel to decide the appropriate path without having to interpret their own basis relative to these references.

General — As discussed in our meeting on April 30, 2004, NEI 04-02 is silent on how to transition fire areas that comply with Appendix R, III.G.3/III.L, alternative or dedicated shutdown. Please address in the guide.

General — NEI 04-02 uses the term "acceptable" in context of described methods, approaches, and related references. The term has specific meaning in NFPA 805. NEI 04-02 should be clear when "acceptable" is used generically or in reference to methods previously endorsed by the NRC (i.e., the authority having jurisdiction).

General — A concern exists about the use of fire PRAs as the basis for calculating changes in CDF and LERF. An initial step in many fire PRAs is a screening analysis to identify important fire locations that have the greatest potential to produce significant fire-induced core damage sequences. Thus, some areas of the plant are not modeled in the fire PRA. The concern is that a proposed change to a fire protection system could have the effect of elevating a previously-screened (that is, un-modeled) area of the plant such that it would be an important fire location. It is recommended that the guidance include an evaluation that determines whether the proposed change results in elevation of a previously-screened fire location to an important location from a fire risk perspective and, if it does, the location is included in the new fire PRA.

Page 11 — Consider adding Reg. Guide 1.174, the ASME PRA Standard and the to-be-developed ANS Fire PRA Standard to the list in Section 1.3.

Page 12 — As above, consider referencing in Section 1.4.2.2 the ASME PRA Standard and the to-be-developed ANS Fire PRA Standard in addition to knowledge of fire PRA as

relevant to an individual's qualifications (these standards discuss analyst qualifications as well).

Page 13 Section 2.2, first sentence: suggest it read, "NFPA 805 has been endorsed by the NRC as a regulation except as noted in 10 CFR 50.48(c)(2), "Exceptions, modifications and supplementation of NFPA 805."" - to be specific.

Page 14 In various places Section 2.3 implies that certain licensing documentation is a complete basis for determining if "previously approved" approaches are acceptable. While licensing documentation issues must be resolved in determining if a "previously approved" approach is acceptable, it is also important that the previously approved approach be reviewed (in a technical sense) for continued adequacy in the context of a post-transition NFPA 805 license basis. This is touched on in Section 4.1.1.

Page 14 Section 2.2.3, 2nd paragraph: Specific guidance for emergency lighting, cold shutdown, and alternate shutdown capability may still be needed in an 805 analysis if required to meet the nuclear safety and radiological performance criteria.

Page 15 Section 2.3, 3rd paragraph: The guidance states, "Compliance with Chapter 3 may also be demonstrated by showing that the NRC has previously approved an alternative to a fundamental program attribute." This paragraph should be clarified to note that NRC approved alternatives for a specific plant would not necessarily apply to other plants.

Page 16 Sections 2.3.3; Page 142, Section 3.5, and Appendix H-1 (Letter of Intent template): These sections should be revised to be consistent in describing the treatment of non-compliance issues withing the licensee's corrective action program, resolution of these issues under the current licensing basis, or alternatively the proposed NFPA 805 licensing basis, and revised enforcement policy included as Appendix 4 to SECY 04-0050.

Page 17 Section 2.4 provides three "licensing paths" for obtaining approval of "alternate methods and approaches" and cites 50.48(c)(4) in this regard. The intent of this section is unclear. 50.48(c)(4) allows a license amendment to be submitted in order to obtain approval for alternatives to compliance with NFPA 805. Topical reports and Safety Evaluations described in Section 2.4 can support a license amendment, however, they are not alternatives to the license amendment process.

Page 23 Section 4.0: NEI 04-02 is not clear on what records constitute the post-transition licensing basis, and specifically, the role of Transition Report in the new licensing basis. Is the transition report a one-time record that maps the initial transition to NFPA 805 with the pertinent licensing basis information captured in other licensee records or does it become a part of the licensing basis documentation. If part of the licensing basis, how is the report maintained to capture future changes? Should there be a recommended replacement for the current standard license condition?

Page 23 Section 3.5, third paragraph: add to end of sentence, "if the extension is granted by the NRC".

Page 24 Section 4.1.1, first bulleted list, second and third bullets: it is not clear who will be conducting this review - should specify. Also, what is the value of the references to NFPA 805 Figure 2.2?

Page 25 Section 4.1.1, last bulleted list, first bullet: suggest not using term “transitioning fire protection program” since it implies that there is some interim program for fire protection during the transition from the CLB to the NFPA 805 Licensing Basis.

Page 26 Section 4.1.2, first paragraph, last sentence: This sentence states that the phases described assume that a decision has already been made, yet the first bullet under Phase 1 is “Make decision to transition the licensing basis.” Phase 1 in Figure 3-2 is titled “Preliminary Assessment”, but the description of Phase 1 on Page 27 does not discuss the assessment leading up to a decision.

Page 33 As discussed in our meeting on April 30, 2004, the document does not appear to provide adequate direction to the licensees in the need to address other shutdown modes in the context of NFPA 805 (e.g., mode 3 for PWRs).

Page 34 Section 4.3.3 – The third bullet on the page should be reworded to read as "For those areas consider combinations of the following options to reduce fire risk depending upon . . ." The sub-bullet items are intended to reduce fire risk during off-normal, non-power operational conditions. However, additional periodic fire patrols (the fourths sub-bullet) in and of itself would not necessarily provide sufficient reductions in fire risk. This comment also applies to the sub-bullet list provided in Appendix F on page 137.

Page 35 Section 4.4, 2nd item 2 on page: Recommend not using the word “optimal” as it depends on too many variables, different value sets, etc. Recommend rewording the last sentence to “… to develop a configuration that provides adequate protection at acceptable cost.”

Page 36 1st bullet, line 3. Insert “numerical” or “quantitative” after “acceptable”

Page 36 1st bullet, last line. Insert “acceptably” before “low”

Page 38 Unless the slash between CDF and LERF in the Figure 4-4 diamonds implies “and,” replace with “and.”

Page 39 Under “Initial Risk Assessment,” citing the IPEEE or internal events PRA model along with a plant Fire PRA requires an additional caveat that the Fire IPEEE (which may involve “only” a FIVE analysis) or a “beefed-up-for-fire” internal events PRA must be conservative relative to what would result from an actual Fire PRA (i.e., must yield larger delta CDF and delta LERF than a Fire PRA would yield). Also add words such as “and large early release frequency (LERF)” after the CDF phrase in the last sentence.

Page 39 Section 4.4.1 and Page 161, Section I.4.1: There are inconsistencies and gaps associated with the treatment of MEFS and LFS associated with fire modeling. Section 4 defines the criterion: MEFS<<LFS, for evaluating the margin between MEFS and LFS. Appendix I does not use this criterion but uses the concept of an “incredible event” with respect to evaluating the LFS. The definition and use of “incredible event” with respect to the LFS is not supported by NFPA 805 and does

not address the margin between MEFS and LFS. With respect to the MEFS<<LFS criterion in Chapter 4, the guidance document does not provide significant guidance with respect to determining what "<<" and "sufficient margin" means. The guidance in Appendix I with respect to establishing the LFS is unclear.

Page 40 Under "Acceptability Determination," perform the following grammar changes: "The resulting *changes in CDF and LERF are* compared ... If the *changes meet* the acceptance ..." In the table, include "and that from all LERF initiators is <1E-5/yr" after 1.0E-4/yr for Region II and do likewise for Region III, using "<1E-4/yr" instead.

Page 40 Section 4.4.2.1, Table: The Comments/Conditions for Region IV states that, "Proposed changes in this region are acceptable regardless of the cumulative total CDF from all initiators". The cumulative total CDF/LERF from all initiators is always important, regardless of the insignificance of a proposed risk-informed change. RG 1.174 specifically states that for Region III (very small increases) that total CDF/LERF does not need to be calculated, but then provides a critical caveat that if there is an indication that the CDF/LERF may be considerably higher than 1E-4/1E-5, the focus should be on finding ways to decrease risk. Section 2.2.4 of RG 1.174 describes four regions, but the fourth region is for risk-beneficial changes (i.e., risk decreases). Thus, in RG 1.174 there is no risk increase considered to be so small that total cumulative CDF/LERF is not important, regardless of how big the total CDF/LERF may be and the only thing considered less than a very small increase (Region III) is a risk decrease.

Page 41 Bottom paragraph. Clarify that the CDF and LERF values must incorporate all known changes to the plant PRA to establish an up-to-date baseline for comparing the effects of the proposed change. This also ensures that the cumulative effects of multiple changes do not place the plant in a condition that exceeds the safety goals.

Page 42 First full paragraph references an IPEEE. Again a caveat as above (Page 39) should be included. Replace "The delta LERF acceptance ... the delta CDF value" sentence with something such as the following. "If the delta CDF satisfies the delta LERF criterion value as well (e.g., delta LERF <1E-6/yr for Region II), delta LERF can be deemed acceptable without a LERF evaluation." Also consider adding something like the following at the end of the same paragraph. "Note that this views 'isolation' in the broader sense of maintaining containment integrity (i.e., no structural breach due to, e.g., rapid overpressure or vessel explosion)."

Page 44 Under "PRA Logic Model," note that since, at a minimum, fire frequencies must replace internal event initiating frequencies in a fire-related CDF/LERF evaluation, there will always be modifications. The statement here ("Safety Margin inherent in that model is preserved") then translates into the Safety Margin *never* being preserved, i.e., *always* requiring an assessment for Safety Margin. In addition, it is unlikely that non-initiator probabilities would remain unchanged, e.g., human error probabilities or fire-induced component failure probabilities. If the authors, indeed, believe that it may be possible to preserve an inherent Safety Margin from an internal event PRA, then the requirements for this preservation must be more lenient than what is proposed.

Page 44 PRA Logic Model. A word of caution is recommended. Given the disparity of methods, data, and level of detail in fire PRAs, it is possible that an important fire-

initiated core damage sequence has been missed or inadequately quantified. Suggest noting this possibility and recommending that the licensee conduct an investigation of potential "new" sequences involving the affected systems or components before asserting that "… no further assessment for Safety Margin is necessary."

Page 45 Section 4.4.2.3, 2nd paragraph – The guide states that the conservatively estimated values cannot "necessarily be included in plant total CDF". Scenario with overly conservative values are important only if they have a significant contribution to the CDF. If they have a significant contribution, then they deserve a more detailed analysis. The detailed analysis would yield a less conservative result. Since R.G. 1.174 requires consideration of the total CDF, fire must be considered simultaneously with other initiators. This statement regarding the consideration of fire risk in the total risk is subject to misinterpretation and potential misuse.

Page 47 Section 4.6: This section suggests that the NRC may request licensees of the first few plants to submit a Transition Report summary. We agree that a summary report could facilitate the license amendment review process and recommend that NEI provide guidance on the content of the summary. The summary report should focus on the unique elements of NFPA 805, including the performance-based approach, consideration of shutdown modes, radiological release associated with fire suppression and the change process. The summary report would be beneficial if it provides descriptions of specific plant fire areas or fire protection features that require the application of the NFPA 805 performance-based, risk-informed methods and how this was performed, including the application of the change process.

Page 48 Section 4.6.1 and Appendix H-2. The license change request finding of no significant hazards consideration should not be based on the NRC's discussion of NFPA 805 in the rule-making Statement of Considerations. The finding of no significant hazards consideration should reflect the plant-specific implementation of NFPA 805. If the licensee proposes alternatives to NFPA 805 provisions, the significant hazards consideration should address these differences.

Page 57 Section 6.0: The purpose of NEI 04-02 is to provide guidance for the implementation of a fire protection program under 10 CFR 50.48(c). There are no provisions within the regulatory requirements of 50.48(c), or NFPA 805, to use the methods and approaches of NFPA 805 within an existing fire protection licensing basis. Conversely, there are also no regulatory prohibitions or limitations on analytical methods used in developing the safety case for license amendments, exemptions, or deviation requests as long as they are technically valid, justified, and defendable as demonstrating adequate protection of the public. In making changes to the existing fire protection program, the licensee must follow the change process allowed under the standard license condition and needs to provide the technical basis to support the change, regardless of the methods employed. Consequently, endorsement of this guide by the NRC will exclude Section 6.0.

Page 58 Section 6.2.1: in first sentence, add "that" after "basis". The second sentence indicates that the change is "just the difference between the configuration of a fire area..." A "plant change" as used in NFPA 805 also includes program changes that

are not specific to a fire area configuration. Last sentence should include defense-in-depth and safety margin as part of the evaluation.

Page 59 Section 6.3, fourth paragraph: NEI 04-02 states that "the NRC has found that NFPA 805 provides a level of fire protection equivalent to that provided by the current regulations,..." Adoption of NFPA 805, with the exceptions stated in the rule language, is an acceptable alternative to complying with 10 CFR 50.48 (b) or the requirements of the licensee's fire protection license conditions. The level of fire protection provided under NFPA 805 is not necessarily equivalent to that provided by the current regulations. NEI 04-02 should state, "The NRC has determined that 10 CFR 50.48(c) is an acceptable alternative to 10 CFR 50(b)."

Page 59 Section 6.2.3, second paragraph, third sentence: provide reference for criteria for determining whether a margin is sufficient.

Page 64 Appendix A: the purpose of this appendix is not clear. There does not appear to be a reference to it in the body of the guidance document. Since most of the words listed in the sample are defined in one referenced document only, there seems little point in a "comparison". Where multiple and different definitions do occur, no guidance is provided regarding which to follow. A more appropriate table would identify any differences between a licensee's definitions and those of the applicable regulatory documents, along with the bases for using a different definition.

Page 65 Appendix B-1: What is the purpose of "mapping" NFPA 805 to the other regulatory documents? Wouldn't a comparison between NFPA 805 and the CLB be sufficient? The second paragraph, second sentence of the description of the table could read, "... Appendix B-1 describes how each "previously acceptable" method of compliance compares to each "fundamental program attribute" of NFPA 805, Chapter 3."

Page 69 Appendix B-2: The staff is unable at this time to fully endorse Appendix B of NFPA 805 or NEI 00-01. This is due to some issues that remain open in the associated circuits closure path.

Page 73 Table B-3: Although this table and others are identified as samples, it should be clearly noted that the NRC's endorsement of NFPA 805 does not necessarily include an endorsement of the specific content of the tables - only the format.

Page 152 Section 4.1.1: see previous comment questioning the need for "mapping"; second sentence: add "power plant" after "nuclear"; third sentence: add "of the Transition Report" after "Appendix B-1" and change "that" to "each".

Page 152 Section 4.1.2: based on the content of 4.1.2.1 and 4.1.2.2, the heading of this section should be "Alternatives to NFPA 805" and "Alternatives to.." should be added to each of the subsection headings. The second sentence of 4.1.2.1 is general in nature and would fit better in Section 4.1.1.

Page 153 Section 4.2.1, first sentence: reference is made to Appendix B-2, saying that it identifies five program elements and then identifies six elements; Appendix B-2 identified four elements. Recommend a comparison of this section with Appendix B-2 writeup to make them consistent - not just in this respect, but in others as well.

Page 156 Appendix H-3, Section 4.2.6.1. Use of the jargon, “grandfathered” is inappropriate. Licensee must demonstrate the deterministic requirements of NFPA 805 are met. The use of such terms could mislead the licensee in regard to the requirements for transitioning the existing fire protection program.

Page 157 Appendix H-3, Section 4.3.1. The tie between the first sentence discussing NUREG-1449 and radiation release protection/performance criteria is not clear. Suggest this discussion be expanded.

Page 161 The last two sentences in the opening paragraph to Section I.4.1 are intended to contrast conditions where a Fire PRA is preferable as a screening tool to a Fire Model, and vice-versa. However, the first condition cited, “large fire - low consequence” is not necessarily screenable via a Fire PRA *a priori* unless the “large fire” is also unlikely, which is essentially the second case, for which Fire Modeling, rather than Fire PRA, is touted as the better screening method. In actuality, Fire PRA is the better screen only if BOTH the frequency and consequence of the fire are low. Fire Modeling would seem the better screen if it is impossible to get the required level of damage to generate high consequence based on the fire phenomenology given the fire conditions (combustibles, ventilation, etc.).

Page 162 2nd para of section I.4.2, 2nd sentence. Insert “sources” after “fire ignition.”

Page 163 Top paragraph, last sentence. Define what is meant by “(performance)” in this context. Is performance referring to failure rate, reliability, ease of maintenance, ability to withstand fire conditions?

Page 163 Item d. The discussion accurately states that manual fire suppression activities shall not be credited. However, the discussion does not address the potential effects of operator recovery actions that could terminate an event. It is assumed they would also not be allowed because of the introduction of PRA-related parameters (recovery failure probability).

Page 165 Section I.4.3. A concern with the approach of using a plant PRA logic models (and not a fire PRA) is that the potential common cause effects of fires may not be adequately addressed unless a specific evaluation of potential common cause vulnerabilities is conducted. In addition, fires may be both the initiators and contributors to the same core damage sequence. Recommend adding text to ensure these potential elements are addressed by the licensee.

Page 166 This discussion under bullet “d” implies that the change impact need be considered only if a bounding fire scenario damages ALL features within an area. Would not the change impact need be considered if the fire damages ANY feature within an area such that the damage to that feature could impact safe shutdown (and subsequent avoidance of core damage)? I believe the authors mean that, by definition, a “bounding” fire scenario is assumed to damage *all* features in an area (because the bounding fire is a worst-case fire that is assigned the full area ignition frequency, and no credit for suppression, etc., is taken, such that *everything* can be assumed to be lost, including *anything* potentially important for safe shutdown). This probably needs rewording.

Page 166 This discussion implies that a “point estimate” approach to calculating CDF and LERF is acceptable. Recommend adding guidance on selection of initiator frequencies and component failure probabilities. Many of the values are available as probabilistic distributions. Should “point estimates” be used or should a Monte Carlo analysis be used during quantification to select and appropriately weight the failure probabilities? If Monte Carlo analysis is conducted, define the appropriate CDF and LERF values to be used in subsequent steps (that is, the mean, median, 90% confidence interval, or other).

Page 168 2nd bullet. Spatial separation is one example. Clarify whether or not other types of “barriers” can be included in the analysis.

Page 170 At the beginning of Section I.5.2, consider referencing the to-be-developed ANS Fire PRA Standard and the to-be-completed EPRI/RES Fire PRA Requantification Study.

Page 171 Under bullet “1" in Section I.5.2.1, note that the plant internal events PRA may (should) also be conservative since there may (should) be more success paths to safe shutdown and avoiding core damage than are credited in the internal events model because Appendix R contingencies are typically not included unless a full Fire PRA is performed.

Page 171 Section I.5.2.1, item 3. It is assumed that this item is referring to the “baseline” scenarios. Suggest clarifying “scenarios.”

Page 171 Last paragraph. It is recommended that special consideration be given to loss of offsite power sequences. It is recognized that such sequences would, in general, be incredible due to separation distances between redundant power systems. However, some fire protection changes could affect this separation, introduce a new sequence, or exacerbate a previously known but low-risk sequence.

Page 172 Under bullet “2,” consider clarifying the explanation of “inclusion” vs. “exclusion.” Inclusion seems to imply that the credited SSCs are specifically modeled in the Fire PRA, while exclusion seems to imply the opposite. But, the last sentence makes it clear that the same SSCs would be specifically modeled as well. Inclusion vs. exclusion does not seem to refer to the Fire PRA model itself, but to the thinking process used to develop the model. If so, this clarification should be added.

Page 173 Under bullet “2,” recognize that some detailed Fire PRAs specifically model failure of fire detectors and manual/automatic suppression per fire area and scenario, such that the “modification factor” would not include considerations of these. There could be a danger of non-conservative double-counting if “generic” severity factors were used in these cases.