

April 17, 2001

Mr. Alex Marion  
Director of Engineering  
Nuclear Energy Institute  
Suite 400  
1776 I Street, NW  
Washington, DC 20006-3708

SUBJECT: NEI 99-03

Dear Mr. Marion:

Attached please find the NRC's assessment of the October 13, 2000 draft of NEI 99-03. An overview of our suggested revisions and recommendations are contained in Attachment 1 to this letter. Our assessment is presented in the form of a redline and strikeout version in Microsoft Word® (Attachment 2). Also attached for clarity is a version of NEI 99-03 which eliminates the strikeout portion (Attachment 3). Attachments 2 and 3 are in Microsoft Word® rather than Corel WordPerfect®. We were unable to alter the Figures in Microsoft Word® to include our comments. Consequently, our comments on the Figures are pen and ink rather than typed. The action to provide this assessment in a Microsoft Word® format resulted in some additional formatting problems, some of which we were unable to overcome.

Our review of NEI 99-03 focused on the accuracy and completeness of the technical information presented in the document. We did not address policy issues. Policy issues concerning control room habitability will be addressed during the public review and comment process associated with the development of the generic communication on control room habitability and related Regulatory Guides. Areas of concentration in our assessment included the manner in which (1) system configuration, operation and performance is verified, (2) control room envelope integrity is tested and inleakage is determined, (3) radiological dose analyses are performed, and (4) control room envelope inleakage greater than the licensing bases for radiological, chemical or fire challenges is resolved.

We have provided no comments on Appendices C and G. We previously provided comments on those Appendices during the January 11, 2001, public meeting with representatives of the NEI Analyses Subgroup.

Sincerely,

**/RA/**

Mark Reinhart, Acting Branch Chief  
Probabilistic Safety Assessment Branch  
Office of Nuclear Reactor Regulation

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## STAFF'S ASSESSMENT OF NEI 99-03

### **Sections 1-9**

The staff has proposed that Figure 1 of Section 1 be modified. Proposed changes included referencing Appendices in the document and clarification and refinement of the actions to be taken. With these revisions, a more detailed road map of use of the document is provided. It has also been recommended that Section 2.1 be revised to either embody the information in Appendix B or, in lieu of that, to reference Appendix B.

In various parts of the document the staff has called attention to the fact that not only must the control room envelope ventilation systems be assessed, but also those ventilation systems which serve areas adjacent to the control room envelope. These ventilation systems have an impact upon the inleakage characteristics of the control room envelope. Therefore, it is imperative that the performance of ventilation systems serving areas adjacent to the control room envelope be assessed in conjunction with the control room envelope ventilation systems.

The verification process of the licensing bases of the design, configuration and operation of the control room envelope, its associated ventilation systems and those ventilation systems serving areas adjacent to the control room envelope is very detailed but seems to have omitted one aspect. The verification process does not appear to address performance. It is equally, if not more important, to verify that control room envelope and associated areas ventilation systems and the boundary are determined to be performing in a manner consistent with the facility's licensing basis. The NRC staff has conducted measurements of control room ventilation systems' performance at several operating plants. On numerous occasions, the staff has identified instances where the control room ventilation systems were aligned as designed, operated as specified by procedures and functioning as described in licensing analyses but actual performance was inconsistent with the licensing bases. Problems included the misappropriated source(s) of air and/or the quantity of air. Consequently, the staff has recommended that those sections of NEI 99-03 which describe the verification of system performance, alignment and configuration be supplemented to incorporate a section which addresses performance. It would appear that Section 5 and Appendix I would be candidates for such a supplement. Many of the revisions which the staff has proposed to NEI 99-03 reflect the incorporation of the performance element into the verification process.

The staff has suggested that a section addressing technical specifications be added as part of the review process of Section 5 to assure that the technical specifications are consistent with the licensing bases. In addition, it was also proposed that a new section be added to Section 8 which acknowledges that one possible means of addressing degraded or non-conforming conditions may be through technical specification changes.

In Section 9, the staff proposed emphasizing that material degradation of the control room envelope is cause for requiring inleakage testing. Increasing inleakage is an indication that the control room envelope integrity programs, which have been implemented, are ineffective.

## Appendices

The staff recommended, and the staff believes that the NEI Task Force on Control Room Habitability is already in agreement, that the material presented in Appendix D on the Murphy-Campe methodology is a duplication of the information contained in the Murphy-Campe paper. It should be sufficient to reference the Murphy-Campe paper in NEI 99-03. The staff also recommended that the section in Appendix D on wind tunnel testing be deleted since it may imply a level of success that has not been demonstrated in licensee's submittals involving atmospheric dispersion and wind tunnels.

In Appendix E of NEI 99-03, the staff proposed wording to emphasize that GDC 19 requires that the reactor be able to be controlled from either the remote shutdown panels or the main control room. Therefore, when addressing inleakage or fire issues, an assessment must be made as to whether either issue can result in the simultaneous loss of reactor control at both areas. If such a condition is identified, then it is required that actions be taken to preclude the simultaneous loss. The staff has also proposed some changes to Figure E.1 to amplify the need to be able to control the reactor from either the control room or the alternate shutdown panels.

The staff has noted that Appendix F, which addresses the use of compensatory measures, only does so in association with radiological challenges. It does not offer any guidance on compensatory actions for toxic gas or smoke challenges. Staff has proposed that a new Section 4 be added to the Appendix which proposes alternative compensatory actions to those presented in the October 2000 draft and that such a proposal not be limited to radiological challenges alone but include fire and toxic gases.

The staff proposed extensive modifications to Appendix J. The Purpose of the Appendix was restated as was the Scope statement. It was recommended that the attributes associated with an acceptable test be accentuated. This was believed to be important because once the test attributes are defined, the selection of a test method becomes less subjective. It was proposed that a discussion in the Appendix which details what an acceptable test entails would be valuable. Consequently, suggested wording was provided. Clarifying information on the determination of the acceptance criteria for radiological, smoke and toxic gas challenges prior to the performance of any test was also provided. The proposed revision to Appendix J was less detailed than the October 2000 draft of NEI 99-03. It was concluded that the extensive details provided in the October 2000 draft of NEI 99-03 were probably more appropriate for inclusion in a plant document than in NEI 99-03. The Tables on component testing were not recommended due to the lack of any correlating evidence of the use of such tests for the particular component or application.

It was proposed that Appendix K be expanded to include Inspection and Maintenance. Appendix K was viewed as only addressing control room envelope sealing which was too limited. Preservation of control room envelope integrity requires much more. The proposed changes to Appendix K reflect that. Accordingly, revisions to the Scope and the Purpose of the Appendix were proposed. It was also suggested that a Section to the Appendix entitled, Discussion, be added which would explain that an active inspection, testing and maintenance program is required if control room envelope integrity is to be maintained. It was also suggested that it be noted in the Discussion Section that some control room envelope designs are insufficiently robust to assure integrity. For some plants, a sealing program improves overall quality of the control room envelope. However, while the sealing improves the quality, it is not a permanent fix. With time, seals degrade. Therefore, it is necessary to frequently inspect those areas which have been sealed and to test the seals. In other instances, there

may exist areas of the control room envelope and the ventilation systems which are free from sealing so that the degradation of seals is not an issue. Nevertheless, degradation of the components or the system remains an issue. In those cases there also needs to be periodic inspections and testing. Consequently, associated with any sealing program must be an inspection and maintenance program and it was proposed that Inspection and Maintenance be added to the title of Section 4, Sealing Program of Appendix K. In expanding Section 4 of the Appendix, a clarification concerning visual inspections and walkdowns was recommended. Visual inspections and walkdowns cannot quantify inleakage. Only testing can do that. A benefit of testing which seemed suitable for highlighting was that the results of control room envelope inleakage testing may allow a plant to limit the sealing program to only those portions of the ventilation systems or envelope which have demonstrated significant inleakage. This has certain monetary benefits. It was proposed that Section 4 be clarified to indicate that the source(s) of inleakage and their potential inleakage rate might be the basis for the determination of the method and frequency of inspection, repairs and modification of the control room envelope. Regardless of the facility, in all cases, an active maintenance program is required to assure integrity once integrity is established. Any control room envelope integrity program should assure that degradation is quickly identified and repairs initiated.

Revisions were proposed to Appendix L which would have plant operators assessing the impacts of breeches upon the control room envelope's ability to withstand radiological, toxic gas and fire challenges. In addition, a precautionary note was proposed to the Appendix to indicate that plant operators should assess the impact of a breach to assure that it does not result in an inducement of new and/or additional inleakage into the control room envelope.