

**From:** "HEYMER, Adrian" <aph@nei.org>  
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October 21, 2005

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**SUBJECT:** Comments on Draft Regulatory Guide DG-1128, Proposed Revision 4 of

Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants" 70 Fed.Reg. 49,953 (August 25, 2005)

The Nuclear Energy Institute (NEI)[1] appreciates the opportunity to provide the following comments on the Nuclear Regulatory Commission's Draft Regulatory Guide (RG) that is intended to become Revision 4 of RG 1.97. The subject guide describes an acceptable method for use in compliance with regulations for accident monitoring instrumentation based on the provisions described in IEEE Std. 497-2002. NEI endorses the use of IEEE Std. 497-2002 as Revision 4 of RG 1.97 and considers it to be an improvement over Revision 3 of RG 1.97. Attached are specific comments and suggested wording changes which we believe will enable existing plants to more effectively use the provisions of IEEE Std. 497-2002.

...see attached for more...

Adrian Heymer  
Senior Director, New Plant Deployment  
Nuclear Energy Institute

E-REDS = ADM-03

See = Jo. TARTAK (EMTA)

SIS Review Complete

Template = ADM-013

(202) 739-8094

aph@nei.org

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[1] NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

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NUCLEAR ENERGY INSTITUTE

Adrian P. Heymer  
DIRECTOR, NEW PLANT DEPLOYMENT  
NUCLEAR GENERATION DIVISION

October 21, 2005

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We agree that Revision 3 of Regulatory Guide 1.97 has become outdated and does not provide criteria for advanced instrumentation system designs based on modern digital technology. IEEE Std. 497-2002 provides guidance which uses performance-based criteria for the selection and design of variables to provide the accident monitoring functions of the individual variables. More importantly, it will align the selection of variables with the plant accident analysis and emergency operating procedures (EOPs).

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The subject guide notes that it is intended for new nuclear plants but that licensees of current operating reactors may voluntarily convert their accident management program to the criteria in the revised guide. Regulatory Position C(1) states, *"If a current operating reactor licensee voluntarily converts to the criteria in Revision 4 of this guide, the licensee should perform the conversion on the plant's entire accident monitoring program to ensure a complete analysis."*

NEI recommends allowing selective use of the revised guidance and IEEE Std. 497-2002 as a basis to justify changes to licensees' existing accident monitoring programs established in accordance with Revision 2 or 3. Such use does not involve complete or partial program "conversion" but would permit licensees to seek changes to their accident monitoring Current Licensing Basis (CLB) using a technical basis based on the Revision 4 guidance.

We believe flexibility is needed in implementation of provisions that could require modifications to accident monitoring instrumentation which meet existing regulatory requirements. Licensees may wish to use IEEE Std. 497-2002 as part of a planned upgrade of accident monitoring capabilities over time. The existing plants should be allowed to make conversions to the new guide on a specific variable or set of variables basis to accommodate on-going digital upgrades in the industry. We acknowledge that a complete analysis should be performed of the entire set of accident monitoring variables program using Revision 4 of to RG 1.97 as part of a conversion process from Revision 3 of to RG 1.97.

The industry recommends that Regulatory Position C(4) be deleted in order to minimize confusion, maintain appropriate consistency with Revisions 2 and 3 of RG 1.97 with regard to contingency actions and avoid dilution of the Type A variable list. Discussion of this issue and others are contained in the enclosure.

If you have any question or wish to discuss these comments, please contact Thomas Houghton at 202.739.8107; [tch@nei.org](mailto:tch@nei.org) or me at 202.739.8094; [aph@nei.org](mailto:aph@nei.org).

Sincerely,



Adrian P. Heymer

Enclosure

## NEI Comments on DG-1128

## Regulatory Position C(1)

The draft position specifies that: *"If a current operating reactor licensee voluntarily converts to the criteria in Revision 4 of this guide, the licensee should perform the conversion on the plant's entire accident monitoring program to ensure a complete analysis."* Such a complete conversion could include unnecessary physical changes, licensing changes, and could have significant cost implications for current operating reactor licensees who decide to convert to the new revision.

NEI recommends allowing selective use of the revised guidance and IEEE Std. 497-2002 as a basis to justify changes to licensees' existing accident monitoring programs established in accordance with Revision 2 or 3. Such use does not involve complete or partial program "conversion" but would permit licensees to seek changes to their accident monitoring Current Licensing Basis (CLB) using a technical basis based on the Revision 4 guidance.

NEI believes the current draft regulatory position will limit cost-effective, performance-based program improvements and is inconsistent with other NRC policy initiatives (e.g., Alternate Source Term). This regulatory position is also inconsistent with the IEEE objective of revising IEEE Std. 497-2002 to *"contain guidance and allow a flexible basis for making changes to such systems in older plants"* (IEEE Std. 497-2002 Introduction page iii).

The stated basis for this regulatory position is that partial conversions could result in the *"potential for loss of variables or interactions with other variables without a complete analysis in accordance with this guide."* NEI believes this concern can be adequately addressed without requiring complete program and licensing changes to Revision 4. For example, by using the selection criteria in IEEE Std. 497-2002, Clause 5, "Performance criteria" to examine the current variables in their accident monitoring programs, existing plants could establish a performance-based basis for the program variables that would not result in the loss of needed information. This use of the Revision 4 selection criteria should be permitted to justify changes to a few variables without requiring licensees to apply all the other IEEE Std. 497-2002 criteria to all variables, or expecting licensees to implement the significant design and licensing efforts and to expend the associated costs needed to revise the entire accident monitoring program to comply with Revision 4. Similar selective use of other Revision 4 criteria could be used to make performance-based improvements in existing accident monitoring programs.

NEI recommends that Regulatory Position C(1) be modified to permit use of Revision 4 information to justify changes to existing programs that are based on

Revisions 2 or 3. The existing "conversion" language should be revised or the following added to the regulatory position:

*"Licensees may use the guidance and criteria in Revision 4 as a basis to justify selective modifications to programs currently complying with Revision 2 or 3. Licensees should ensure that such program modifications do not result in unacceptable variable loss or interactions."*

### **Regulatory Position C(2)**

NEI generally agrees with the intent of Regulatory Position C(2) which relaxes the IEEE Std. 497-2002 requirement for instrumentation calibration during an accident. However, we believe that the intent is to provide such means during the required instrument duration (i.e., post-event operating time) and not necessarily for the full accident duration. For example, a particular Type A variable may only be required for 6 hours after certain DBAs. In this case calibration or access may not be necessary since the duration of need (6 hours) is less than the equipment's normal calibration interval. This interpretation is consistent with the objectives of the guidance and recognizes that the required operating time for some variables, particularly Type A variables, may be less than the duration of the accident.

NEI suggests the following revision to the Regulatory Position C(2) text which modifies IEEE 492 Clause 6.7:

*"To the maximum extent possible, considering instrument accessibility, means shall be provided for maintaining instrument calibration during the required instrument duration."*

### **Regulatory Position C(3)**

The guide should clarify that the accident source terms defined by both TID-14844 and Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors" meet the intent of *"a source term that shall consider a damaged core capable of surviving the accident environment."*

Existing plant CLBs use source terms based on TID-14844 or the AST to comply with the guidance contained in NUREG-0660, "NRC Action Plan Developed as a Result of the TMI-2 Accident," and NUREG-0737, "Clarification of TMI Action Plan Requirements" with respect to accident monitoring instrumentation and other post-accident considerations. Accordingly, these source terms represent a damaged core capable of surviving the accident environment.

NEI suggests the following be added to the discussion portion of Position C(3):

*“Regarding damaged core source terms, existing plants may use the guidance contained in TID-14844 or the AST as described in Regulatory Guide 1.183, ‘Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors’.”*

#### **Regulatory Position C(4)**

NEI disagrees with this regulatory position which effectively includes instrumentation associated with certain “contingency actions” within the scope of the accident monitoring instrument program, in particular as Type A variables. This position is inconsistent with IEEE-492 and Regulatory Guide 1.97 Revisions 2 and 3 which all exclude such instrumentation associated with contingency actions from the scope of the accident monitoring instrumentation program. The NRC proposes a process whereby such contingency action instruments would initially be included in the list of instruments. The licensee would then be required to justify excluding them. The only NRC guidance regarding the exclusion process is an example; *“if the contingency action takes place beyond the plant’s licensing basis.”*

NEI believes this regulatory position is unnecessary and confusing. In particular, it has the potential of diluting the significance of the Type A variables, which are appropriately required based on the plant accident analysis and design basis, by including other less important contingency action variables. IEEE Std. 497-2002 defines contingency actions as *“alternative actions taken to address unexpected responses of the plant or conditions beyond its licensing basis (for example, actions taken for multiple equipment failures).”*

In Regulatory Position C(4) the NRC example suggests that contingency action variables can be excluded *“if the contingency action takes place beyond the plant’s licensing basis.”* This position appears to involve circular logic since, by definition, contingency actions are beyond the plant’s licensing basis, and, therefore, can be excluded. Alternatively, the NRC may interpret the IEEE contingency action definition to include *“alternative actions taken to address unexpected responses of the plant”* that are within the design basis. NEI believes that such actions and associated variables are already addressed under Type D variables and it is inappropriate to categorize such variables as Type A. Clause 4.4 states that such Type D variables indicate the performance of safety systems, auxiliary supporting features, and other systems necessary to achieve and maintain safe shutdown and are based, in part, on the contents of plant EPGs, EOPs, and AOPs. It is reasonable to expect such procedures to include variables associated with important actions taken to address unexpected plant responses.



The industry NEI recommends deletion of Regulatory Position C(4) in order to minimize confusion, maintain appropriate consistency with Revisions 2 and 3 with regard to contingency actions, and prevent dilution of the Type A variable list.

### **Proposed New Regulatory Position**

NEI suggests the following new regulatory position:

*“The provisions of IEEE Std. 497-2002 Clauses 7.1, 7.2, 7.3, and 7.4 regarding environmental and seismic qualification shall be interpreted to mean that environmental and seismic qualification of accident monitoring variables shall be in accordance with a plant’s current licensing basis (CLB); the information in IEEE 323-1983 and IEEE 344-1987 (if not part of the CLB) may be considered if appropriately justified and consistent with current regulatory practice.”*

The environmental and seismic qualification discussions in IEEE Std. 497-2002 Clauses 7.1, 7.2, 7.3, and 7.4 should be amended in a regulatory position to specify that environmental and seismic qualification shall be in accordance with a plant’s current licensing basis (CLB) and not IEEE 323-1983 and IEEE 344-1987 although these standard versions may be used as guidance.

Regarding environmental qualification, Clauses 7.1, 7.2, 7.3, and 7.4 currently state, in part, that Types A, B, C, and D variables shall be environmentally qualified for the particular accident’s postulated environment at the installed location *“in accordance with IEEE Std 323-1983”*. This may be appropriate for plants that have committed to the 1983 version of IEEE 323. However, the environmental qualification licensing basis for existing plants is 10 CFR 50.49, as clarified by plant specific commitments and other NRC guidance documents, such as Regulatory Guide 1.89 Rev. 1, the DOR Guidelines, and NUREG-0588. For these operating plants IEEE 323-1983 is not typically identified as part of the CLB (termed LBD in IEEE Std. 497-2002). It is also noteworthy that IEEE 323-1983 has not been endorsed by a Regulatory Guide and has been superseded by IEEE 323-2003. Although some future plants may identify IEEE 323-1983 as part of the plant’s CLB, it is more likely that such plants will reference IEEE 323-2003. Similar considerations apply to a plant’s seismic CLB and IEEE 344-1987.

### **Proposed New Regulatory Position**

NEI suggests the following new regulatory position:

*Replace the current contents of Clause 5.4 c) with the following: “The qualification duration for Type C variable instrument channels shall be the duration for which the measured variable is required by the plant’s LBD.”*

NEI agrees with IEEE Std. 497-2002 Clause 5.4 that the operating time of each variable shall be defined and addressed in the qualification program. Further, NEI agrees that these times shall be based on a plant's CLB (referred to as the LBD by IEEE Std. 497-2002). However, we disagree with the standard's guidance in Clause 5.4 c) regarding a minimum 100 day operating time for Type C variables, particularly when this time conflicts with a plant's CLB. While 100 days may (or may not) be appropriate and consistent with the design basis for future plants, a significant number of existing plants have established shorter environmental qualification program operating times (e.g., 30 days) for Type C variables. For any existing plants seeking to use Revision 4 as the basis for their accident monitoring instrumentation, their CLB should be preserved.

#### **“Not Intended for Current Operating Plants” language**

In Regulatory Position C(1) and in the Regulatory Analysis, page 13, DG-1128 states: *“Therefore, Revision 4 is not intended for current operating reactor licensees.”* Since Regulatory Position C(1) specifically permits use of Revision 4 with certain constraints by existing plants these statements are incorrect and can be confusing. While it may be more appropriate to state that “Revision 4 was primarily intended for future reactor licensees,” it would be equally appropriate to delete these statements. NEI recommends deletion of these two statements without substitution.