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September 15, 1995  
NG-95-2834

Mr. William T. Russell, Director  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
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Subject: Duane Arnold Energy Center  
Docket No: 50-331  
Op. License No: DPR-49  
Comments to the NRC on Draft Regulatory Guide DG-1043 Nuclear  
Power Plant Simulations Facilities For Use In Operator License  
Examinations

File: A-117

Dear Mr. Russell:

ANSI/ANS-3.5-1993 is endorsed by NRC in the Draft Regulatory Guide. However, some clarification of items in the ANSI standard should be made to ensure a nationwide standard approach to simulator certification methods. These are as follows:

- Page 7 of ANSI/ANS-3.5-1993, Section 4.4.1 Simulator Validation Testing requires that validation tests must be conducted "whenever a modification is made to the simulator that affects its fidelity relative to the reference unit or its functional operation as a simulator. Modifications to the simulator design shall be validated through testing prior to use in training and examination."  
"This test shall include a demonstration that the simulator represents the reference unit to the scope required by Section 3, "General Requirements." Section 4, "Simulator Testing and Validation," provides the criteria for validating that these requirements are met."

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The implication here is that after a modification as defined above and before training or examinations can be conducted, the following tests must be conducted:

- A. All evolutions must run in real time. (3.1.1) [Criteria found in 4.1.1]
- B. The simulator limits must be tested. (3.1.2) [Criteria found in 4.1.2]
- C. Normal evolutions tests must be conducted (3.1.3). [Criteria found in 4.1.3.3].
- D. Malfunction testing must be conducted. (Listed in 3.1.4 and training capabilities required by 3.3.2) [Criteria found in 4.1.4 and 4.3.2].
- E. Physical fidelity must be verified. (3.2) [Criteria found in 4.2].
- F. Ten (10) Initial Conditions shall be operational (3.3.1) [Criteria found in 4.3.1].
- G. Freeze, snapshot and IC Reset must be tested. (3.3.3) [Criteria found in 4.3.3].
- H. "Local actions external to the control room" (Remote Functions) must be tested. (3.3.4) [Criteria found in 4.3.4].

This requirement needs to be clarified such the intent of Validation Testing is commonly understood. The requirement to test all of the above items upon performing any modifications to the simulator is seldom necessary and does not meet the intent of maintaining high fidelity with the reference plant. The following words should be added to Revision 2 to Regulatory Guide 1.149:

Section 4. "Simulator Testing and Validation" of ANSI/ANS-3.5-1993 requires a validation test be performed whenever a modification is made that affects simulator fidelity or simulator functional operation. The intent of this test is to ensure that no noticeable differences exist between the simulator control room and simulated systems when evaluated against the control room and systems of the reference unit. Validation tests, as defined, should be considered to be only the portion of those tests required by Section 3. "General Requirements" which are determined to be affected by the modification and therefore must be conducted in order to meet the intent of Section 4.

- Section 4.4.2 "Simulator Operability Testing" requires "A simulator operability test shall be conducted once per calendar year..." This is a change to the performance test defined in ANSI/ANS-3.5-1985, which is required annually. Because 10CFR55.45 requires a report to be submitted once every four years on the anniversary of the submittal of the original certification report, the "annual" requirement has been interpreted to mean a 12 month period starting with the anniversary of the submittal. At DAEC the original NRC Form 474 was submitted on March 25, 1991 and testing for the next four

year cycle was scheduled to begin on April 1, 1991. The first four year report was submitted to NRC on March 25, 1995 and the next four year cycle began on April 1, 1995. In order to meet the "calendar year" requirement at DAEC we would have to complete the Operability Testing before December 31, 1995 which is almost three (3) months earlier than originally scheduled. Because the intent of the operability test is to verify simulator fidelity with the reference unit or "best estimate" data, the schedule for completion of the test appears to be of no consequence to the result. Therefore, it is suggested that Revision 2 to Regulatory Guide 1.149 clarify Section 4.4.2 in the following way:

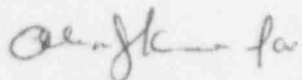
Section 4.4.2, "Simulator Operability Testing" of ANSI/ANS-3.5-1993 requires that a simulator operability test be conducted once per calendar year. Facility licensees who have reported via NRC Form 474 an established schedule which meets the requirements of 10CFR55.45 may continue testing per that schedule without regard to the "calendar" year requirement of Section 4.4.2.

- Paragraph 1.6 declares the in addition to the malfunctions listed in Section 3.1.4 of ANSI/ANS-3.5-1993 "The simulator's performance of other malfunctions, component failures, and component overrides, if applicable to the facility by incorporation in the planned training and examination scenarios and exercises, should also be tested at least once every four years, approximately 25% per year." The last paragraph is Paragraph 1.6 confuses this requirement by stating that "Periodic performance and malfunction testing may be integrated with a facility licensee's approved or accredited training program that uses a systems approach to training if performance data are obtained during the training session and analyzed for compliance with the performance criteria listed in ANSI/ANS-2.5-1993." This section needs to be clarified such that it is clear that if performance testing is integrated with the accredited training program, there is no requirement to additionally test those same malfunctions once every four year approximately 25% per year.
- Section 4.1.3.1.4 requires that Condenser Vacuum match reference unit data within 2% of the reference unit instrument loop range. Condenser Vacuum is subject to changes in the external environment of the reference unit. Outside air temperature, humidity and therefore circulating water temperature have the effect of changing the value of this parameter. It has been the experience of this facility licensee that obtaining reference unit baseline data after each modification to the unit and then attempting to modify the simulator to remain in high fidelity with the reference unit is desirable, but that to maintain

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parameters such as Condenser Vacuum in high fidelity is not cost effective. In addition it has been determined by training value assessment performed by Subject Matter Experts that actual condenser vacuum conditions are not a high training value item for fidelity purposes. Rather, the relative condenser vacuum condition is used during transient conditions to help determine if operator action is proper. Because this parameter (Condenser Vacuum) has a low training value for fidelity purposes during steady state testing, it should not be included in the list of those parameters required to be verified by Section 4.1.3.1.4.

Sincerely,



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JDC/KP/so

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