GE Nuclear Energy

General Electric Company
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Document Control Desk
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Robert M. Gallo, Chief
Special Inspection Branch
Division of Inspection and Support Programs
Office of Nuclear Reactor Regulation

Subject: Reply to Notice of Nonconformance

Reference: Letter from Robert M. Gallo to Craig P. Kipp, *NRC Inspection Report No. 99900003/97-01*, dated May 20, 1997.

The purpose of this letter is to reply to the three nonconformances 99900003/97-01-01, 99900003/97-01-02 and 99900003/97-01-03 contained in the reference letter.

The attachment to this letter provides a description of the steps that have been or will be taken to correct these items, a description of the steps that have been or will be taken to prevent recurrence, and the dates the corrective actions and preventive measures were or will be completed.

If you have any questions, please call me or C. W. Smith at (910) 675-5613.

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Sincerely,

Ralph J. Reda

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IE04-13 VENDOR INSP.

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Introduction

The letter from Robert M. Gallo to Craig P. Kipp, *NRC Inspection Report No. 99900003/97-01*, dated May 20, 1997 presented Inspection Report No. 99900003/97-01 which contained three nonconformances. The Notice of Nonconformance is reiterated followed by the response to these nonconformances. Corrective actions and preventive measures are provided along with the dates for each action.

Notice of Nonconformance

On the basis of the results of an inspection by the staff of the U.S. Nuclear Regulatory Commission (NRC) from March 10 through 14, 1997, it appears that the following activities were not conducted in accordance with NRC requirements:

1. Criterion III of Appendix B to 10 CFR Part 50, "Design Control,", requires, in part, that measures shall be established for the identification and control of design interfaces and for coordination among participating design organizations. These measures shall include the establishment of procedures among the participating design organizations for the review, approval, release, distribution, and revision of documents involving design interfaces.

   Paragraph 3.3 of Section 3, "Design Control" General Electric (GE) Nuclear Energy Quality Assurance Manual NEDO-11209, dated March 31,1989, requires, in part, that GE design documents be furnished to the customer to provide for interface compatibility review and coordination by owner design organizations.

   Contrary to the above requirements, GE did not adequately inform licensee design organizations implementing the average power range monitor-rod block monitor-technical specification (ARTS) modification of the need to consider the 1 percent fuel plastic strain limits and the associated mechanical overpower (MOP) limits in addition to the minimum critical power ratio limits when evaluating rod block monitor (RBM) operability for a rod withdrawal error (RWE) event. GE's supplemental reload licensing reports for ARTS plants did not adequately address requirements for RBM operability with regard to the MOP limits. This inadequate interface between GE and ARTS licensees contributed to (1) the failure of licensees to ensure through their plant technical specifications that the RBM was operable to protect fuel cladding at applicable plants, and (2) occasions during Fermi Cycles 4, 5, and 6, Hatch Unit 1 Cycles 16 and 17, Hatch Unit 2 Cycles 13 and 14, Brunswick Cycle 10, and Duane Arnold Cycle 14 when based on GE's RWE analyses the fuel cladding had exceeded its MOP limits and had the potential of exceeding its plastic strain limits. (99900003/97-01-01)

2 Criterion V of Appendix B to 10 CFR Part 50, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions and procedures of a type appropriate to the circumstances, and shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

GE Nuclear Energy Quality Assurance Manual NEDO-11209, Section 5, "Instructions, Procedures, and Drawings," dated March 31, 1989, requires, in part, that documented instructions, procedures, and drawings be utilized to communicate quality requirements throughout all phases of design.

Contrary to the above requirements, GE (1) modified peaking factors when the MOP limits were exceeded in the RWE analyses, (2) applied alternate rod patterns in addition to normal rod patterns in the RWE analyses, and (3) revised the theoretical density values used in the peak cladding temperature (PCT) analysis to reduce the calculated PCT, without documented instructions or procedures. (99900003/97-01-02)

3 Criterion XVIII of Appendix B to 10 CFR Part 50, "Audits," requires, in part, that periodic audits shall be carried out to determine the effectiveness of the quality assurance program. Follow-up action, including reaudit of deficient areas, shall be taken where indicated.

GE Nuclear Energy Quality Assurance Manual NEDO-11209, Section 18, "Audits," requires, in part, that the audit program provide for follow-up action, including any necessary reaudit of deficient areas.

Contrary to the above requirements, Detroit Edison Company (DECo) audited GE in 1992 and 1993 and observed several deficiencies regarding design control, including GE's failure to inform DECo (and other ARTS licensees) that the MOP limits would be exceeded if the RBM was not operable during an RWE event. GE took corrective actions for specific deficiencies but did not conduct follow-up action, including reaudit of the design control area, to determine the effectiveness of the program. (99900003/97-01-03)

Reply to Notice of Nonconformance

This document represents the response to NRC Inspection Report No. 99900003/97–01. The letter accompanying the report lists three Nonconformances which require corrective actions. GE has prepared a list of corrective actions and preventive measures which address these nonconformances. The corrective actions are designed to correct the unsatisfactory or inadequate condition. The preventive measures will serve to prevent recurrence of this type of less than satisfactory or inadequate condition. These actions are summarized in Table 1.

GE Responses, Corrective Actions and Preventive Measures

1. A critical self assessment determined that, although significant verbal and informal communications were held with affected customers, communications with our customers in the Supplemental Reload Licensing Report (SRLR) have been less than adequate.

   As corrective actions, letters were sent to all customers with an RBM system, apprising them of the MOP/RBM operability issue. The specific plants impacted by this issue (Fermi, Hatch, Brunswick and Duane Arnold) were so notified. Additional plant and cycle-specific analyses were performed for the impacted plants to assure that, should an RWE occur, there would be no exceedence of the strain limit. As preventive measures, our RWE Technical Design Procedure (TDP-0035) has been revised to specify required customer consultation and wording for the SRLR utility communication. The SRLR format has been reviewed with respect to the changes made to TDP-0035, and it has been determined that further changes to the SRLR format would be superfluous and that sufficient preventive measures have been built into TDP-0035 (which include instructions for statements to be made in the SRLR when appropriate).

2. All analytical processes and analyses supporting GE reload licensing analyses are performed in accordance with applicable procedures for which there are multiple levels of guidance provided to the engineers. Reload licensing analyses are controlled by Fuel Engineering Operating Procedures (FEOPs) and most calculations are covered by Technical Design Procedures (TDPs). FEOP 30-7.00, *Technical Design Procedures*, identifies guidelines for preparing TDPs. Additionally, FEOP 30-7.00 acknowledges that not every calculation is covered by a TDP, and provides guidance for those analytical processes not covered by TDPs. It is acknowledged that there was no TDP for the cited analyses, but there is an FEOP in place to cover the RWE analyses in accordance with Criterion V.

   Assumptions for the RWE analysis (e.g., control rod pattern) have consistently been identified in procedures, are adequate for confirmation of statistically based RWE analyses and were discussed with the NRC Reactor Systems Branch in 1989. The RWE procedure has been continuously updated to reflect adequate feedback from the analysis organization (5 revisions since 1989). GE does, however, agree that the RWE procedure can be improved.

   As corrective actions and preventive measures, TDP 0035 has been revised to improve communication with the utility on the need for RBM operability and to explicitly require MOPs calculations for all fuel types. Additionally, this procedure is

being revised to include additional guidance on local peaking factor adjustments and rod patterns, and to document conservatisms in the analyses.

With regard to the change in pellet theoretical density value, a procedure is now in place (P&P 70–43, *Reporting Of ECCS Model Changes And Errors*) that requires GE to report to each utility any change in PCT—either increase or decrease. This procedure, issued in late April 1997, was specifically written to address the utilities' reporting requirements of 10CFR50.46. Changes in PCT, such as the change in the pellet theoretical density value, will be fully documented and reported per this procedure.

As further preventive measures, FEOP 30-7.00 is being reviewed to assess any need for further strengthening to ensure the adequacy or existence of necessary procedures.

3 GE QA conducts regular Design Engineering audits and follow-up activities per 10CFR50 Appendix B. These audits include reaudit of "significant" issues. Evidence of both biannual audits and reaudits of areas where weaknesses had occurred and were considered significant were provided to the inspection team during the inspection.

In 1992 and 1993 two utility Corrective Action Requests (CARs) were issued related to GE's Rod Withdrawal Error analysis. These CARs were subsequently closed with the utility's review and approval. GE failed to provide a follow-up audit on these CARs because, at the time, the issue was not deemed sufficiently "significant" to warrant such a reaudit (particularly since they had been closed with the issuing utility's approval).

As corrective and preventive actions, GE has strengthened the requirements for conducting annual adequacy reviews of analytical processes. The need to strengthen this process was self-identified in May, 1996, and the governing FEOP 30-7.00 was revised accordingly in November, 1996. This is GE's primary tool for assessment and control of the adequacy of specific analyses. The 1997 adequacy reviews will be conducted in the third and fourth quarters of 1997. As a follow-up of the effectiveness of the revised process, QA will conduct an audit of the revised adequacy review process in late 1997.

Table 1

Corrective Actions and Preventive Measures

	Action	Implementation Date	Nonconformance or Weakness Addressed
1.	Sent letters to all utility customers apprising them of the potential RBM operability requirement for designs not meeting the MOP criterion for RWE. Impacted plants were so informed at this time.	Internal letter sent on 2/17/97. Subsequent customer letters followed during last week in February, 1997.	Nonconformance 1 and 2
2.	Revised TDP-0035 to reflect required customer consultation in the event of a potential need for RBM operability which includes appropriate wording in the SRLR. Additionally it has been revised to require MOP checks for all fuel types. TDP-0035 is also being revised to include guidance on local peaking factor adjustments and rod patterns and to document conservatisms in the analysis.	First revision (Rev 3) completed, March, 1997 Further revisions (Rev 4) to be completed by 8/29/97	Nonconformance 1 and 2 and weakness cited on page 8 of the inspection report
3.	Special analyses were performed for impacted plants to assure adequate margin to the strain limit for RWE where MOP exceedences were indicated.	completed 6/6/97	Nonconformance 2
4.	*Reporting Of ECCS Model Changes And Errors,* P&P 70–43 has been issued.	4/20/97	Nonconformance 2
5.	Review FEOP 30-7.00 to assess any need for further strengthening to ensure adequacy or existence of necessary procedures	8/29/97	Nonconformance 2
6.	Strengthen requirements in FEOP 30-7.00 for annual adequacy reviews of TDPs	Completed 11/96	Nonconformance 3
7.	Perform a follow-up QA audit of the revised adequacy review process	12/19/97	Nonconformance 3