

October 2, 2003

Mr. James F. Klapproth, Manager
Engineering & Technology
GE Nuclear Energy
175 Curtner Ave
San Jose, CA 95125

SUBJECT: GE NUCLEAR ENERGY LICENSING TOPICAL REPORT NEDC-33075P,
"GENERAL ELECTRIC BOILING WATER REACTOR DETECT AND
SUPPRESS SOLUTION - CONFIRMATION DENSITY" (TAC NO. MB5705)

Dear Mr. Klapproth:

By teleconference dated September 25, 2003, the NRC staff discussed with your staff its plans regarding its proposed audit of the subject licensing topical report (LTR). This LTR documents the technical solution - the Detect and Suppress Solution - Confirmation Density (DSS-CD). The DSS-CD introduces an enhanced detection algorithm, the Confirmation Density Algorithm (CDA), which would reliably detect the inception of power oscillations and generate an early power suppression trip signal prior to any significant oscillation amplitude growth and minimum critical power ratio (MCPR) degradation. Enclosed for your information is the proposed agenda for this audit which was e-mailed to you prior to the audit.

During this call your staff informed us that the software audit would be limited as the actual development of the algorithm was in its early stages. GENE stated that the actual design, implementation, and verification would not be done until a plant-specific application. This audit could be done for Brunswick but this type of information for Brunswick would not be available until December 2003. Your staff did state that the NRC could audit the process for software development and do an audit for the design, implementation and verification at a later date. Given this, the staff stated that the software development and implementation would not be addressed in the DSS-CD safety evaluation. The staff plans to audit the Brunswick software in December 2003. However, once the staff completes the assessment of the software system development life cycle for the Brunswick application, future applications in other plants would not need to be reviewed by the staff if the software remains the same as that used in Brunswick.

J. Klapproth

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If you have questions regarding this letter, please contact me at (301) 415-1445.

Sincerely,

/RA/

Alan B. Wang, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Project No. 710

Enclosure: Agenda

cc w/encl: See next page

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GE Nuclear Energy

Project No. 710

cc:

Mr. George B. Stramback
Regulatory Services Project Manager
GE Nuclear Energy
175 Curtner Avenue
San Jose, CA 95125

Mr. Charles M. Vaughan, Manager
Facility Licensing
Global Nuclear Fuel
P.O. Box 780
Wilmington, NC 28402

Ms. Margaret Harding, Manager
Fuel Engineering Services
Global Nuclear Fuel
P.O. Box 780
Wilmington, NC 28402

Mr. Glen A. Watford, Manager
Technical Services
GE Nuclear Energy
175 Curtner Avenue
San Jose, CA 95125

AGENDA FOR AUDIT

OCTOBER 1–3, 2003

Audit Scope

The NRC staff intends to carry out an audit at GE Nuclear Energy on October 1-3, 2003. The purpose of the audit is to review the detect and suppress - confirmation density (DSS-CD) solution and the software development process for the DSS-CD. Listed below are the areas of interest for this audit.

Backup Stability Protection (BSP)

1. Provide a final description of the complete BSP option including technical specifications.
2. BSP and Auto BSP analysis. Both frequency domain and time domain analyses.

DSS-CD Analysis

3. Provide a summary of all issues related to application for new fuel cores and new fuel vendors.
4. Provide an analysis of the Nine Mile Point 2 event from the point of view of DSS/CD.
5. Provide a summary of the intended changes to the final licensing topical report (LTR) including technical specifications.
6. Provide a timetable for conclusion of the DSS/CD review in terms of generic as well as plant-specific application.
7. TRAC-G analysis for fuel bundles other than GE fuel.
 - * SLMCPR calculation for other fuel types.
 - * TRAC-G capabilities to model non-GE fuel to support DSS-CD plant specific implementation.
8. Other stability related issues -- such as DIVOM for Long-Term Stability Option 1-D in case regional instability occurred during high power uprate.

TRACG LTR

9. Provide a detailed outline of a standalone TRACG LTR, not just for DSS-CD application.

Software Audit

Software audit topics are classified into a number of software development activities and associated products. The following activities and products will be included in the audit. Activities and products that are to be accepted without further examination are indicated by an asterisk.

Software Review Type

<u>Activity</u>	<u>Product</u>
Requirements	Software Requirements Specification (SRS) Requirements Safety Analysis (SAR) V&V Requirements Analysis Report CM Requirements Report
Design	Hardware & Software Architecture Design Specification Design Safety Analysis V&V Design Analysis Report CM Design Report
Implementation	Code Listings Code Safety Analysis V&V Implementation Analysis and Test Report CM Implementation Report
Integration	System Build Documents Integration Safety Analysis V&V Integration Analysis and Report CM Integration Report
Validation	Validation Safety Analysis V&V Validation Analysis and Test Report CM Validation Report

Questions

Requirements Activity, Software Requirements Specification

1. Are the requirements organized and presented in such a way that the evaluation team found the SRS reasonably easy to understand?
2. Does the SRS contain (directly or by reference) all requirements imposed on the software by the System Design Document (SyDD) and SAR?
3. Are the safety criteria for which the software is responsible specified in the SRS?
4. Does the SRS include requirements for responses to design basis events specified in the SAR?

Requirements Activity, Requirements Safety Analysis

1. Were the analysts independent from the development team?

2. Have the analysts followed the Software Safety Plan?
3. Have the analysts ensured that the software safety requirements are traceable to the SyDD or SAR?

Requirements Activity, V&V Requirements Analysis Report

1. Were the verifiers independent from the development team?
2. Have the verifiers ensured that the software requirements are testable?
3. Have the verifiers followed the Software V&V Plan?
4. Have the verifiers ensured that the software requirements are traceable to the SyDD or SAR?

Requirements Activity, CM Requirements Report

1. Is there evidence that the Configuration Management Plan was followed?
2. Are the software requirements items and documents under configuration control?

Design Activity, Hardware & Software Architecture

1. Is the architecture description organized and presented in such a way that the evaluation team found the Software Architecture Design Description (SADD) reasonably easy to understand?
2. Does the SADD contain design elements that include all requirements imposed by the SRS?
3. Is there convincing evidence that the architectural design team has a correct, complete understanding of what the software will do within this application?
4. Is there convincing evidence that the software architecture meets the system constraints specified in the SyDD, SAR and SRS?
5. Has the software architecture design been partitioned in a manner consistent with the problem?

Design Activity, Design Specification

1. Is the detailed design organized and presented in such a way that the evaluation team found the Software Detailed Design Description (SDDD) reasonably easy to understand?

2. Does the SDDD contain design elements that include all requirements imposed by the SRS?
3. Is there convincing evidence that the software detailed design team has a correct, complete understanding of what the software will do within this application?
4. Is there convincing evidence that the software detailed design meets the system constraints specified in the SyDD, SAR, SRS and SADD?
5. Has the software detailed design been partitioned in a manner consistent with the problem?
6. Has the detailed design team followed the Software Development Plan?

Design Activity, Design Safety Analysis

1. Were the analysts independent from the development team?
2. Have the analysts followed the Software Safety Plan?
3. Have the analysts ensured that the software safety design elements are traceable through the software requirements to the SyDD or SAR?

Design Activity, V&V Design Analysis Report

1. Were the verifiers independent from the development team?
2. Have the verifiers ensured that the software design elements are testable?
3. Have the verifiers followed the Software V&V Plan?
4. Have the verifiers ensured that the software design elements are traceable to the SRS?

Design Activity, CM Design Report

1. Is there evidence that the Configuration Management Plan was followed?
2. Are the software design items and documents under configuration control?

Implementation Activity, Code Listings

1. Is the implementation organized and presented in such a way that the evaluation team found it reasonably easy to read and understand?
2. Can every design element be traced forward to specific implementation units?
3. Can every implementation unit be traced backward to specific design elements?

4. Is there convincing evidence that the software implementation meets the system constraints specified in the SyDD, SAR and SRS?
5. Does the implementation incorporate the implementation constraints documented in the SDD?

Implementation Activity, Code Safety Analysis

1. Were the analysts independent from the development team?
2. Have the analysts followed the Software Safety Plan?
3. Have the analysts ensured that the software safety code elements are traceable through the software design and software requirements to the SyDD or SAR?

Implementation Activity, V&V Implementation Analysis and Test Report

1. Were the verifiers independent from the development team?
2. Have the verifiers ensured that the software implementation is testable?
3. Have the verifiers followed the Software V&V Plan?
4. Have the verifiers ensured that the software implementation elements are traceable to the SDD?

Implementation Activity, CM Implementation Report

1. Is there evidence that the Configuration Management Plan was followed?
2. Are the software code elements under configuration control?

Integration Activity, System Build Documents

1. Is the build procedure organized and presented in such a way that the evaluation team found it reasonably easy to read and understand?
2. Can the build procedures be traced forward to specific validation and installation elements?
3. Can the build procedures be traced backward to the specific code elements that are included in the builds?

Integration Activity, Integration Safety Analysis

1. Were the analysts independent of the development team?

2. Have the analysts followed the Software Safety Plan?
3. Have the analysts ensured that the software safety build elements can be traced from the software code elements?

Integration Activity, V&V Integration Analysis and Report

1. Were the verifiers independent from the development team?
2. Have the verifiers followed the Integration Verification Plan?
3. Have the verifiers ensured that the software integration elements are traceable to the Software code elements?

Integration Activity, CM Integration Report

1. Is there evidence that the Configuration Management Plan was followed?
2. Are the build elements under configuration control?

Validation Activity, Validation Safety Analysis

1. Were the analysts independent of the development team?
2. Have the analysts followed the Software Safety Plan?
3. Have the analysts ensured that a complete trace exists from the system design and safety analysis report, through the software requirements, software design, software implementation to the integration?

Validation Activity, V&V Validation Analysis and Test Report

1. Were the validators independent from the development team?
2. Have the validators followed the Software Validation Plan?
3. Have the validators ensured that the software elements being validated are traceable to the SyDD?

Validation Activity, CM Validation Report

1. Is there evidence that the Configuration Management Plan was followed?
2. Are the review, inspection and test elements under configuration control?