November 27, 2006

Mr. Bob E. Brown
General Manager, Regulatory Affairs
GE Nuclear Energy
P. O. Box 780, M/C A-30
Wilmington, NC 28401

SUBJECT: FINAL SAFETY EVALUATION FOR GENERAL ELECTRIC NUCLEAR ENERGY (GENE) LICENSING TOPICAL REPORT (LTR) NEDC-33075P, REVISION 5, "GENERAL ELECTRIC BOILING WATER REACTOR DETECT AND SUPPRESS SOLUTION - CONFIRMATION DENSITY" (TAC NO. MC1737)

Dear Mr. Brown:

By letter dated July 24, 2002, and revisions dated January and August 2004 and December 2005, GENE submitted LTR NEDC-33075P, "General Electric Boiling Water Reactor Detect and Suppress Solution - Confirmation Density" to the U.S. Nuclear Regulatory Commission (NRC) staff. By letter dated July 13, 2006, NRC draft safety evaluations (SEs) regarding our approval of LTR NEDC-33075P, Revision 5, were provided for your review and comments. GENE commented on the draft SEs via e-mails dated August 14, 17, and 22, 2006. The NRC staff's disposition of GENE's comments on the draft SEs are discussed in Attachment 1 to the final SEs enclosed with this letter.

The NRC staff has found that LTR NEDC-33075P, Revision 5, is acceptable for referencing in licensing applications for GENE designed boiling water reactor/3 through /6 product lines using GE14 and earlier GE fuel designs to the extent specified and under the limitations delineated in the LTR and in the enclosed final SE. The final SE defines the basis for our acceptance of the LTR.

Our acceptance applies only to material provided in the subject LTR. We do not intend to repeat our review of the acceptable material described in the LTR. When the LTR appears as a reference in license applications, our review will ensure that the material presented applies to the specific plant involved. License amendment requests that deviate from this LTR will be subject to a plant-specific review in accordance with applicable review standards.

In accordance with the guidance provided on the NRC website, we request that GENE publish accepted proprietary and non-proprietary versions of this LTR within three months of receipt of this letter. The accepted versions shall incorporate this letter and the enclosed final SE after the title page. Also, they must contain historical review information, including NRC requests for additional information and your responses. The accepted versions shall include an "-A" (designating accepted) following the LTR identification symbol.

If future changes to the NRC's regulatory requirements affect the acceptability of this LTR, GENE and/or licensees referencing it will be expected to revise the LTR appropriately, or justify its continued applicability for subsequent referencing.

Sincerely,

/RA/

Ho K. Nieh, Deputy Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 710

Enclosures: 1. Final Non-proprietary SE
2. Final Proprietary SE

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Prop. SE: ML062640330 Prop. TER: ML062640362
Package: ML062640371 *No major changes from SE input NRR-106, 043

OFFICE	PSPB/LA	SBWB/BC	EICB/BC	PSPB/PM	PSPB/BC	DPR/DD
NAME	DBaxley	GCranston	*AHowe	MHoncharik	SRosenberg	NHieh
DATE	10/31/06	11/1/06	6/21/06	11/22/06	11/7/06	11/27/06

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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

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

Andrew A. Lingenfelter, Manager
GNF Engineering
Global Nuclear Fuels - Americas, LLC
P.O. Box 780, M/C F12
Wilmington, NC 28402

Mr. Louis Quintana
Manager, Licensing
GE Nuclear Energy
P. O. Box 780, M/C A-30
Wilmington, NC 28401

FINAL SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

GE NUCLEAR ENERGY LICENSING TOPICAL REPORT

NEDC-33075P, "GENERAL ELECTRIC BOILING WATER REACTOR DETECT AND SUPPRESS SOLUTION - CONFIRMATION DENSITY"

PROJECT NO. 710

1.0 INTRODUCTION

By letter dated July 24, 2002 (Reference 1), General Electric (GE) Nuclear Energy (GENE) requested U.S. Nuclear Regulatory Commission (NRC) review of licensing topical report (LTR), NEDC-33075P, "General Electric Boiling Water Reactor [BWR] Detect and Suppress Solution - Confirmation Density [(DSS-CD)]." During the course of the NRC staff review, GENE submitted revisions to the LTR, dated January and August 2004 and December 2005 (References 2, 3, and 4, respectively). The purpose of NEDC-33075P is to provide the licensing basis and methodology used to demonstrate the adequacy of the DSS-CD solution to reliably detect and suppress anticipated stability related power oscillations. This safety evaluation (SE) will provide a generic licensing basis for DSS-CD applications to GE BWR/3-6 product lines using GE14 and earlier GE fuel designs and an operating envelope up to and including extended power uprate (EPU) and maximum extended load line limit analysis plus (MELLLA+).

LTR NEDC-33075P describes a digital-based safety-related solution for detecting coupled neutronic/thermal-hydraulic instabilities in BWRs. The DSS-CD trip function identifies the beginning of power oscillations and generates a reactor trip signal before the oscillation amplitudes exceed the plant safety limit minimum critical power ratio (SLMCPR) for anticipated power oscillations. The LTR also provides a description of Backup Stability Protection (BSP) approaches that may be used when the DSS-CD licensing basis algorithm cannot be demonstrated to provide its intended SLMCPR protection. The BSP trip function provides a diverse means of preventing power oscillations from exceeding the SLMCPR. The LTR documents the design philosophy used in the development of the DSS-CD hardware/software, licensing basis, and required changes to the technical specifications (TS) and bases for the implementation of DSS-CD. The hardware design is unchanged from the Option III solution described in References 5, 6, and 7. The firmware/software is modified relative to Option III to reflect the specific DSS-CD stability detection methods, which may include an upgrade to the automatic signal processor card.

The NRC staff review includes the subject LTR and its revisions References 1 through 4), responses to the NRC staff's requests for additional information (RAIs) (References 8 through 10) and supporting information submitted by GENE (References 11 through 28). The NRC staff was assisted in its review by its consultant, Oak Ridge National Laboratory (ORNL), who wrote the technical evaluation report (TER). The review conducted by ORNL with the NRC staff's confirmatory calculations (Appendix A to the TER) indicated that the proposed methodology to define detect and suppress methodology is adequate and satisfies the requirement for an acceptable long-term stability (LTS) solution. The NRC staff has reviewed the TER and has adopted the findings recommended by ORNL.

2.0 REGULATORY EVALUATION

The DSS-CD design provides automatic detection and suppression of a reactor instability and minimizes reliance on the operator to suppress instability events. The Confirmation Density Algorithm (CDA) is designed to recognize an instability and initiate control rod insertion before the power oscillations increase much above the noise level. The DSS-CD solution and its related licensing basis were developed to comply with the requirements of General Design Criteria 10 and 12 in Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR), Appendix A, "General Design Criteria for Nuclear Power Plants."

Criterion 10, "Reactor design," requires that: "The reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences."

Criterion 12, "Suppression of reactor power oscillations," requires that: "The reactor core and associated coolant, control, and protection systems shall be designed to assure that power oscillations which can result in conditions exceeding specified acceptable fuel design limits are not possible or can be reliably and readily detected and suppressed."

To ensure compliance with Criteria 10 and 12, Appendix A, 10 CFR Part 50, the NRC staff will confirm that the licensee performs the plant-specific trip setpoint calculations using NRC-approved methodologies as prescribed in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Chapter 4. The subject LTR provides the licensee's application to support its TS license amendment changes.

Appendix B to 10 CFR Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," establishes the minimum quality requirements for the design, fabrication, construction, and testing of structures, systems, and components of nuclear power plants and fuel reprocessing facilities. Nuclear power plants include the structures, systems, and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. These requirements establish the criteria by which the NRC staff review the development of safety system hardware and software for use in nuclear power plants.

The GENE safety system development process has been approved by the NRC staff as a process that is consistent with the requirements of 10 CFR Part 50, Appendix B. The DSS-CD and BSP trip functions were developed for use in GE-design BWRs using the GENE safety system development process, thereby addressing the requirements of 10 CFR Part 50, Appendix B.

3.0 TECHNICAL EVALUATION

LTR NEDC-33075P, Revision 5, describes the methodology proposed by GENE to define the licensing basis and reload applications for the DSS-CD solution. The DSS-CD licensing basis consists of two major components: (a) an efficient oscillation detection algorithm - the CDA, providing an early trip signal upon instability inception prior to any significant oscillation amplitude growth and minimum critical power ratio (MCPR) degradation and (b) a set of GE proprietary integrated Transient Reactor Analysis Code (TRACG) event simulations for reasonably limiting anticipated events that confirm the limited effect on the MCPR performance within the stated applicability range. This SE evaluates component (a) of the DSS-CD solution. A separate SE will be issued to cover the TRACG component (b) of the evaluation.

3.1 Solution Design Concept and Description

The DSS-CD hardware design is unchanged from the Option III solution described in Reference 5. The firmware/software is modified relative to Option III to reflect the specific DSS-CD stability detection methods. The DSS-CD design provides automatic detection and suppression of reactor instability events to minimize reliance on the operator to suppress instability events. However, alarms are provided to alert the operator of an increase in the number of confirmed period counts so actions can be taken to avoid a reactor scram.

The basic input unit of the DSS-CD system is the oscillation power range monitor (OPRM) cell. The OPRM cell consists of one to eight closely spaced local power range monitor (LPRM) detectors. The signals from the individual LPRM detectors in a cell are averaged to produce the OPRM cell signal. For the DSS-CD solution the maximum number of LPRM detectors per OPRM cell is limited to four. The cell signal is filtered to remove noise components with frequencies above the range of stability related power oscillations. This is accomplished by a second order Butterworth filter with cutoff frequency of 1.0 Hz. This conditioned signal is filtered again using second order Butterworth filter with a shorter cutoff frequency of 1/6 Hz (or an equivalent time constant of 0.95 seconds) to produce a time-averaged value. The conditioned and time-averaged signals are used by the four algorithms to detect reactor instabilities. Each of the four independent OPRM channels consists of many OPRM cells distributed throughout the core so that each channel provides monitoring of the entire core.

The DSS-CD solution includes four separate algorithms for detecting stability related oscillations: CDA, Period Based Detection Algorithm (PBDA), Amplitude Based Algorithm (ABA), and Growth Rate Algorithm (GRA). The PBDA, ABA, and GRA detection algorithms provide the protection basis for LTS Option III (Reference 7). They are retained in DSS-CD as defense-in-depth algorithms and are not part of the licensing basis for the DSS-CD solution, which is accomplished solely by the CDA. The CDA is designed to recognize an instability and initiate control rod insertion before the power oscillations increase much above the noise level. The CDA capability of early detection and suppression of instability events is achieved by relying on the successive confirmation period element of PBDA. The CDA employs a low amplitude OPRM signal discriminator to minimize unnecessary spurious reactor scrams from neutron flux oscillations at or close to the OPRM signal noise level. The CDA identifies a confirmation density (CD), which is the fraction of operable OPRM cells in an OPRM channel that reach a target successive oscillation period confirmation count. When the CD exceeds a preset number of OPRM cells and any of the confirming OPRM cell signals reaches or exceeds the amplitude discriminator setpoint (S_{AD}), an OPRM channel trip signal is generated by the

CDA. A reactor trip is generated when multiple channel trips are generated, consistent with the reactor protection system (RPS) logic design. The bi-stable characteristic of the CD, where the value remains at zero except at the instability threshold, when it rapidly transitions to unity, provides excellent discrimination between stable and unstable operation. DSS-CD eliminates the reliance on the PBDA amplitude setpoint, which is included in the licensing basis of Option III. The instability suppression by the DSS-CD for high growth instability events occurs within a few full oscillation periods from the time the instability is sensed by the PBDA. Because the solution does not rely on oscillation growth to a specified high amplitude setpoint, suppression occurs within a short time from oscillation inception or close to the low amplitude OPRM signal discriminator and significant margin to the SLMCPR is provided. The concern of the time constant used for DSS-CD (0.95 second versus 6.0 seconds for OPRM) is addressed in Section 3.4.1 of NEDC-33075P, Revision 5, with respect to gaining significantly more safety margin for detecting power oscillations.

The NRC staff has reviewed the design concept and found it acceptable, because the DSS-CD solution complies with Criteria 10 and 12 of 10 CFR Part 50, Appendix A, and the DSS-CD solution enhances overall plant safety by providing reliable, automatic oscillation detection and suppression function while avoiding unnecessary scrams.

3.2 TRACG Code Qualification and Uncertainties

The TRACG is a GE proprietary version of the Transient Reactor Analysis Code (TRAC). The TRACG code is used to simulate limiting events to confirm the DSS-CD solution early oscillation detection and suppression capability.

TRACG uses advanced best-estimate one-dimensional and three-dimensional methods to model the phenomena that are important in evaluating the operation of BWRs. Best-estimate analyses performed with TRACG have been approved by the NRC to support licensing applications in different areas, including specific thermal-hydraulic instability performance and anticipated operational occurrence (AOO) transients.

TRACG has been extensively qualified against separate effects tests, component performance data, integral system effects tests, and full-scale BWR plant data. Section 5 of NEDC-33075P, Revision 5, provides a limited TRACG qualification and a treatment of uncertainties for critical power ratio (CPR) calculations following the code scaling, applicability and uncertainty (CSAU) methodology and the **[ ]** is described on pages 4-18 and 4-19, representing **[ ]**. To confirm the reasonableness of the proposed DSS-CD uncertainty levels, GE has performed the TRACG calculations **[ ]**. The results demonstrate that, even for these very large CPR oscillations, DSS-CD provides sufficient protection before safety limits are violated. A full review of the DSS-CD TRACG application report also indicates that it is acceptable to support the DSS-CD application. Therefore, the TRACG calculations in Section 4 of NEDC-33075P, Revision 5, are acceptable for this evaluation. An SE for the DSS-CD TRACG application will be issued separately, but is not required for the implementation of the DSS-CD LTR.

3.3 Reload Analysis and Plant Specific Application

The standard plant-specific review process, which applies to the reload process, consists of an applicability checklist (provided in Table 6-1 for two loop operation (TLO) and in Table 6-2 for single loop operation (SLO)), confirming that the generic application envelope, as defined in Section 4 of NEDC-33075P, Revision 5, is not exceeded. Section 6 of NEDC-33075P, Revision 5, describes the procedure for applicability extension to a new plant, and a new type of fuel or significant design change. Tables 6.3 and 6.4 document the procedure for an applicability extension. This procedure **[**

]. The results of this transient calculation are evaluated with the DSS-CD algorithm. The final MCPR is calculated and must show margin to SLMCPR as specified in Tables 4.1 and 4.6.

The NRC staff concludes that this applicability extension procedure is acceptable, because it involves a plant- and cycle-specific calculation of the most likely limiting instability scenario and the preventive nature of the DSS-CD scram.

3.4 <u>Backup Stability Protection</u>

Section 7 of NEDC-33075P, Revision 5, provides a description of BSP approaches that may be used when the OPRM system is inoperable up to and including operation in the MELLLA+ domain. The elements of the BSP are confirmed on a plant- and cycle-specific basis to provide consistency with the LTS general requirement of long-term applicability.

The example simulations in Section 4 of NEDC-33075P, Revision 5, indicates that the instabilities that grow rapidly to amplitudes sufficiently large to compromise the SLMCPR are very likely when operating the reactor at uprated powers and, especially, at reduced flow conditions (e.g., MELLLA+). **[**

]. GENE concluded and the NRC staff agrees that manual actions to prevent SLMCPR violations are not sufficient because of the fast nature of the transient. Thus, a BSP is required in case DSS-CD is declared inoperable. The BSP concept, documented in Section 7 of NEDC-33075P, Revision 5, is a technically acceptable solution to the backup issue.

The BSP methodology is composed of three solutions: (a) manual; (b) automated; and (c) BSP boundary. The manual BSP methodology is intended as a transition between DSS-CD and automated BSP or BSP boundary. Manual BSP will be used for the first 12 hours after DSS-CD is declared inoperable. This is consistent with the Standard TS requirement as it takes some time to switch from DSS-CD to the automated BSP protection, and it is therefore technically acceptable. Thereafter, the manual BSP is used in conjunction with either the automated BSP or the BSP boundary. With the automated BSP option, a scram is automatically generated if the reactor enters the exclusion region. With the BSP boundary option, the reactor power is reduced below the BSP line so that two RPT's will not result in immediate operation inside the exclusion region. Both the automated BSP and the BSP boundary rely on calculations to demonstrate that instabilities outside the exclusion regions are not likely.

The NRC staff concludes that the proposed BSP methodology is an acceptable solution, because it provides sufficient protection against SLMCPR violations commensurate with the probability of an instability event in the short period of time that they are active.

3.5 Technical Specification for DSS-CD

The proposed changes to the TSs are documented in Section 8 of NEDC-33075P, Revision 5. The proposed changes are acceptable, because they require DSS-CD to be operable and have operability and surveillance requirements consistent with other reactor protection systems. Should the DSS-CD be declared inoperable, initiation of actions to implement the manual BSP regions is required immediately, and implementation of either automated BSP or reduction of power below the BSP boundary is required. Without automated BSP, DSS-CD must be restored to operable within 120 days.

3.6 Instrumentation and Control

The DSS-CD and BSP trip function are implemented in software on the existing plant control room Power Range Neutron Monitoring System (PRNMS) equipment. The design of the existing PRNMS will be changed to incorporate a new panel video screen display to be used for setting values and for monitoring the function of the DSS-CD and BSP trip functions. Additionally, an alarm tile will be added to the main control room instrument panel to indicate the status of the DSS-CD and BSP trip functions. The safety related equipment has been previously approved by the NRC staff SE to NEDC-32410P-A, Revision 5, in the initial PRNMS installation.

3.6.1 Computer System Security

As stated in NEDC-32410P-A, Revision 5, the safety-related functions of the PRNMS have three levels of security. The first level requires a password only. The second level is implemented by the use of a keylock switch on each average power range monitor (APRM) and rod block monitor (RBM) chassis to provide Operate and INOP mode switching. The third level is implemented by requiring a correctly entered password and switching modes with the keylock switch. Passwords can be entered only by the operator at the APRM and RBM chassis and can not be remotely entered through the plant computer.

The first level of security, in combination with administrative controls, is used to prevent unauthorized performance of the following activities at the APRM chassis:

- Acceptance of reference thermal power values (%CTP) downloaded from the plant computer (for use by the APRM to calculate a new APRM gain adjustment factors (GAFs)).
- Acceptance of plant computer requests for the APRM and LPRM chassis to perform LPRM I/V curves.
- Bypassing or unbypassing an LPRM.
- Authorizing use of single recirculation loop operation setpoints.
- Changing assignments of transient test outputs.

The second level of security - keylock control of the chassis mode switch (without password) - is used to prevent unauthorized change of the chassis from the operate to the maintenance mode, from which surveillance and hardware calibration can be accomplished, some of which will take the chassis out of service (temporarily disabling the safety function).

The third level of security - keylock controlled access to the chassis maintenance mode plus password controlled access to setup screen - is used to prevent unauthorized changing of setpoint values or parameters and chassis configuration items. This security level is used for accepting LPRM GAFs downloaded from the plant computer via the RBM chassis.

The second and third levels of security are used on both the APRM and RBM. The first level of security is used only on the APRM. All three levels of security are accessible only under administrative controls at the display panel.

Critical data received from other systems are validated prior to their use by the APRMs. The data to be validated includes items such as GAFs, %CTP, LPRM detector signals, and recirculation flow loop differential pressure signals. The GAFs and %CTP values are determined by the plant computer and then downloaded to the APRMs only after the values are confirmed and accepted by the plant operator at the APRM display panels.

Additionally, the APRM is designed to ignore, without extra processing burden, excessive messages or requests from the RBM, thus providing information isolation from the plant computer in the event of a denial of service type of cyber attack.

On the basis of the previously approved PRNMS LTR NEDC-32410P-A, including the security issues discussed in this SE, the NRC staff concludes that the computer security measures discussed above effectively isolate the safety-related implementation of the DSS-CD and BSP trip functions from the plant computer and from outside interference and, therefore, are acceptable.

3.6.2 System Development

The NRC staff reviewed the development of the DSS-CD and BSP trip functions in two audits. The purpose of the audits was to ensure that the DSS-CD and BSP trip functions were developed in conformance with the criteria in 10 CFR Part 50, Appendix B.

In the first audit, the NRC staff reviewed the following planning and requirements development activities and products using the documents listed in Table 1.

Activity	Product
Planning	Software Management Plan Software Development Plan Software Quality Assurance Plan Software V&V Plan Software Configuration Management Plan
Requirements	Software Requirements Specification

Configuration Management Requirements Report

The NRC staff found the planning documents to be acceptable. The planning requirements in the documents were consistent with industry practices that are commensurate with safety-related software development quality assurance activities.

The NRC staff reviewed the software requirements specification and the configuration management requirements report. The NRC staff found that the requirements-based documents were acceptable and adhered to procedures controlling safety-related system development activities, which are controlled by GENE through its 10 CFR Part 50, Appendix B, quality assurance program.

Conformance with the planning requirements were then reviewed by the NRC staff in a second audit of the DSS-CD and BSP trip functions software development processes after these systems had been implemented as software, and the DSS-CD system had been integrated with the GENE NUMAC PRNMS. The audit topics in the second audit were classified into a number of software development activities and associated products. The following activities and products were included in the second audit:

Activity	Product
Requirements	Software Requirements Specification
Design	Software Design Specifications
Implementation	Software Coding
Integration	Software Test Plans Factory Acceptance Testing

In the second audit, the NRC staff reviewed the DSS-CD software development process after the DSS-CD had been implemented as software and integrated with the PRNMS. The NRC staff selected four requirements for tracing the development effort through the GE baseline development life cycle. These requirements are listed in Table 1.

The NRC staff used the documents listed in Table 3 as the source of the information documenting the development activities conducted by GENE. The NRC staff reviewed the software requirements specifications, associated data sheets, test cases, and related test results reports.

On the basis of the second audit, the NRC staff identified the issues in Section 3.6.1 through Section 3.6.3 below as open items that must be addressed by licensees to implement the DSS-CD trip function and, optionally, the BSP trip function to detect and suppress power oscillations.

3.6.3 Control of Licensing Basis Set Points and Adjustable Settings

Document No. 26A6050AA, Section 2.4, Definitions, provides the following definitions for parameter states:

STATE	Characterization of the ability to change the parameter value. A STATE of a parameter is either FROZEN, FIXED, or ADJUSTABLE.
FROZEN	The value of the parameter is hardwired in the software/hardware and can not be modified.
FIXED	The value of the parameter is fixed at the Set Value per the system licensing basis. However, an adjustable range is built into the software/hardware to allow changing the value consistent with possible changes to the system licensing basis.
ADJUSTABLE	The parameter may be varied between the specified Minimum and Maximum Values by input at the operator console. The Set Value is the default upon system initiation.

Document No. 26A6050AA defined the parameters listed in Table 4 as FIXED parameters and the parameters in Table 5 as ADJUSTABLE parameters.

Two parameters in Table 4 (N_P and S_p) are specific to the PBDA, therefore, although these two parameters are FIXED parameters, the operator-adjustable values for these two parameters are not applicable to the licensing basis of the plant since the PBDA is retained as defense-in-depth.

Two parameters in Table 5 (N_{AL} and AL) were appropriately defined by GENE as parameter values that may be changed without considering the effect on the plant licensing bases. Three parameters in Table 5 (m, $P_{BSP-Trip}$, and $W_{BSP-Trip}$) can cause the operator to actuate a RPS trip when the BSP trip function is selected by the operator as the primary stability protection system for protecting the reactor from power oscillation instability events. These parameters are ADJUSTABLE parameters. Although GE characterizes these parameters as ADJUSTABLE, since the BSP trip function is credited as a licensing basis system, the value of these parameters are controlled and can only be changed with guidance provided by GE.

On the basis of the above parameter definitions, the NRC staff concluded that the FIXED parameter values N_{Th}, P_b, W_b, T_{min}, ε_0, M_{AX}, $LPRM_{min}$, and f_c, and the ADJUSTABLE parameter values m, $P_{BSP-Trip}$, and $W_{BSP-Trip}$ are licensing basis values, and should be controlled as such by licensees using the DSS-CD trip function, and, as appropriate, the BSP trip function.

3.6.4 Use of DSS-CD Trip Function and BSP Trip Function in Plants Other Than Brunswick Steam Electric Plant, Units 1 and 2

Section 3.1 of the Project Plan (Document No. 1208-JXB15-KB0), which is specific to Brunswick Steam Electric Plant, Units 1 and 2, stated that there is no requirement to verify and validate the DSS-CD trip function code for transportability considerations with respect to using this product in other NUMAC PRNM plants. Therefore, the NRC staff concluded that if licensees other than the licensee for Brunswick Steam Electric Plant, Units 1 and 2, install the DSS-CD trip function, those licensees must ensure this product is applicable in their plant licensing bases, including the optional BSP trip function if it is to be installed.

3.6.5 Manual Actuation of the BSP Trip Function

If the BSP trip function is to be manually enabled by a reactor operator upon loss of the DSS-CD trip function, the TSs provide an associated time required for this action to be completed and a basis for that time.

Licensees opting to implement the BSP trip function must address the procedure by which the BSP trip function will be enabled upon loss of the DSS-CD trip function, with the proposed time required for this action to be completed and a basis for that time.

The NRC staff reviewed the DSS-CD trip function and the BSP trip function computer security and development processes, the software requirements specifications, associated data sheets, test cases, and related test results reports. The NRC staff found the requirements-based documents are acceptable in the areas the NRC staff reviewed, and reflect adherence to GENE procedures controlling safety-related system development activities, which are controlled by GENE through its 10 CFR Part 50, Appendix B, quality assurance program.

The NRC staff found that GENE followed its system development procedures appropriately in translating the audited system requirements into the system described in the Project Plan. The NRC staff concludes that the development activities performed by GENE are generally consistent with 10 CFR Part 50, Appendix B, system development procedures and are, therefore, acceptable.

4.0 CONCLUSION

The NRC staff has reviewed the subject LTR (References 1 and 4) and the response to the NRC staff's RAIs (References 6, 7, and 8) to determine acceptability of the LTR, NEDC-33075P, Revision 5.

The existing Solution III is already approved for plant operation up to 20 percent EPU. DSS-CD is an extension of Solution III, where the need to determine the PBDA scram setpoint with a DIVOM correlation is eliminated by setting the setpoint to the Amplitude Discriminator value (i.e., coherent oscillations just above a nominal noise level will result in an automated scram). Thus, DSS-CD is, in essence, a Solution III implementation with the PBDA setpoint set at very conservative setting.

The DSS-CD is a technically acceptable methodology for any reactor operating up to MELLLA+ conditions which are analyzed with TRACG (which is approved in a separate SE). The confirmation analyses documented in Section 4 of NEDC-33075P, Revision 5, indicate that the DSS-CD methodology provides significant protection against MCPR criteria during anticipated instability events even under high-power-density conditions, including EPU and MELLLA+.

Plants operating in the MELLLA+ domain require a backup methodology that does not rely on manual operator actions in the event that DSS-CD is declared inoperable. The analyses documented in NEDC-33075P, Revision 5, indicate that for reactors operating in the MELLLA+ domain: a) instabilities are very likely following flow reduction events; b) these instabilities develop in a time frame of a few seconds, so that manual operations to suppress them are not acceptable; and c) the consequences of these instabilities can be serious.

A BSP methodology with related TS is described in Section 7 of NEDC-33075P, Revision 5. TS have been provided for the two different actions related to the manual BSP boundary (Section 7.3) and the automated BSP (Section 7.4) options. The NRC staff review of the proposed backup options is provided below:

a. When the DSS-CD solution is inoperable, the automated BSP option requires that the licensee implement the automated BSP scram option within 12 hours. The plant then has 90 days to provide a report to the NRC staff with a corrective action plan and schedule for NRC staff review.

b. If the automated BSP option cannot be implemented, the TS requires the licensee to implement the manual BSP option within the next 12 hours. This would require the licensee to reduce operation of the plant to below the BSP boundary defined in the core operating limits report (COLR). The licensee then has 120 days to restore the DSS-CD solution or shutdown the plant. If neither the automated or manual BSP options can be implemented, the plant must be placed in a condition in which the limiting condition for operation (LCO) does not apply (i.e., less than 20 percent RTP or Mode 2) in less than 4 or 6 hours, depending on the LCO applicability.

The NRC staff concludes that the backup options with the proposed TS actions will provide adequate protection against an instability event when the DSS-CD solution is inoperable. Therefore, the NRC staff concludes that the proposed backup options and associated TSs are acceptable.

The DSS-CD methodology is technically acceptable to detect and suppress oscillations, should they occur. Therefore, the NRC staff concludes that DSS-CD is a technically acceptable methodology for any reactor operating up to EPU conditions. The NRC staff has concluded that LTR NEDC-33075P, Revision 5, is acceptable with conditions and limitation described as follows:

1. The NRC staff has reviewed on a separate report the implementation of DSS-CD using the approved GENE Option III firmware and software and found it acceptable. Implementations on other Option III platforms will require plant-specific review.

2. Tables 6.1 and 6.2 of NEDC-33075P, Revision 5, document a plant-specific applicability checklist, which contains specific criteria that must be reviewed and satisfied for each core reload. This methodology is a technically acceptable process for plant- and cycle-specific reviews of DSS-CD applicability.

3. For situations where the plant applicability checklist is not satisfied (e.g., introduction of a new fuel type), Tables 6.3 and 6.4 of NEDC-33075P, Revision 5, describe a technically acceptable procedure to extend the future applicability of DSS-CS.

4. Section 8 of NEDC-33075P, Revision 5, provides a description of required changes to TSs and an example is provided in Appendix A. The proposed TSs are acceptable for the implementation of DSS-CD.

5. Table 6.5 of NEDC-33075P, Revision 5, describes the fuel transition scenarios, which are subject to a plant-specific review for each application.

6. Application of an alternative to the generic CDA setpoints with respect to the susceptibility of a plant's intrinsic noise will require a plant-specific review.

7. The hardware components required to implement DSS-CD are expected to be those currently used for the approved Solution III. If the DSS-CD hardware implementation deviates significantly from the approved Solution III, a hardware review by the NRC staff may be necessary.

8. The NRC staff concludes that the plant-specific settings for eight of the FIXED parameters and three of the ADJUSTABLE parameters appear to be licensing basis values. The process by which these values will be controlled must be addressed by licensees.

9. The NRC staff concludes that if plants other than Brunswick Steam Electric Plant, Units 1 and 2, use the DSS-CD trip function, those plant licensees must ensure the DSS-CD trip function is applicable in their plant licensing bases, including the optional BSP trip function, if it is to be installed.

5.0 REFERENCES

1. NEDC-33075P, "General Electric Boiling Water Reactor Detect and Suppress Solution - Confirmation Density," July 24, 2002, ADAMS Accession No. ML022190708.

2. NEDC-33075P, Revision 3, "General Electric Boiling Water Reactor Detect and Suppress Solution - Confirmation Density," January 2004.

3. Letter, George Stramback (GE) to USNRC, DSS-CD Licensing Topical Report, NEDC-33075P Revision 4, MFN 04-073, August 2, 2004, ADAMS Accession No. ML042180428.

4. NEDC-33075P, Revision 5, "General Electric Boiling Water Reactor Detect and Suppress Solution - Confirmation Density," MFN 05-145, December 1, 2005, ADAMS Accession No. ML053420450.

5. NEDO-31960-A, BWR Owners' Group Long-Term Stability Solution Licensing Methodology, November 1995.

6. NEDO-31960-A, Supplement 1, BWR Owners' Group Long-Term Stability Solutions Licensing Methodology, November 1995.

7. NEDO-32465-A, BWR Owners' Group Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications, August 1996.

8. Letter, George Stramback (GE) to USNRC, Response to NRC RAI regarding DSS-CD LTR, MFN 04-001, January 23, 2004.

9. Letter, George Stramback (GE) to USNRC, Response to DSS-CD LTR RAIs, MFN 05-148, December 7, 2005, ADAMS Accession No. ML053430196.

10. Letter, Louis Quintana (GENE) to USNRC, Responses to DSS-CD LTR RAI - Uncertainties, MFN 06-129, May 10, 2006, ADAMS Accession No. ML061350084.

11. Letter, George Stramback (GE) to USNRC, Responses to Request for TRACG Analysis Inputs for MELLLA+ and DSS-CD LTR Review, MFN 03-001, January 14, 2003.

12. Letter, George Stramback (GE) to USNRC, Response to Request for TRACG Inputs for MELLLA+ and DSS-CD LTR Review, MFN 03-016, March 11, 2003.

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14. Letter, George Stramback (GE) to USNRC, TRACG Analysis for MELLLA+ and DSS-CD LTR Review, MFN 03-028, April 21, 2003, ADAMS Accession No. ML031150651.

15. Letter, George Stramback (GE) to USNRC, Information to Support NRC Review of MELLLA+ and DSS-CD LTRs, MFN 03-037, June 4, 2003, ADAMS Accession No. ML031600645.

16. Letter, George Stramback (GE) to USNRC, NRC Review of TRACG Code for DSS-CD, MFN 03-040, June 23, 2003, ADAMS Accession No. ML031760562.

17. Letter, George Stramback (GE) to USNRC, NRC Review of TRACG Code, MFN 03-116, October 13, 2003.

18. Letter, George Stramback (GE) to USNRC, DSS-CD Licensing Topical Report - Harmonic Modes of the Neutron Flux, MFN 03-118, October 31, 2003, ADAMS Accession No. ML033090163.

19. Letter, George Stramback (GE) to USNRC, DSS-CD LTR, TRACG Files, Scram Times, MFN 03-138, November 5, 2003.

20. Letter, George Stramback (GE) to USNRC, Proposed TRACG LTR - Revised Scope. MFN 04-006, February 6, 2004, ADAMS Accession No. ML040420435.

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22. Letter, George Stramback (GE) to USNRC, 04-019, Issuance of DSS-CD TRACG LTR, NEDE-33147P, MFN 04-019, February 27, 2004, ADAMS Accession No. ML040630652.

23. Letter, George Stramback (GE) to USNRC, DSS-CD Licensing Topical Report - Initial Test Data, MFN 04-157, May 24, 2004, ADAMS Accession No. ML041480517.

24. Letter, George Stramback (GE) to USNRC, DSS-CD Modeling, MFN 04-078, August 16, 2004, ADAMS Accession No. ML042330405.

25. Letter, George Stramback (GE) to USNRC, Responses to DSS-CD TRACG LTR RAIs, MFN 05-133, November 11, 2005.

26. Letter, George Stramback (GE) to USNRC, Licensing Topical Report, NEDC-33264P, General Electric Boiling Water Reactor, GE Analysis of OPRM Noise, MFN 06-065, March 1, 2005, ADAMS Accession No. ML060650427.

27. Letter, George Stramback (GE) to USNRC, GE Evaluation of OPRM Performance during Instability Events at Nine Mile Point Nuclear Unit 2 and Perry Nuclear Power Plant, MFN 06-89, March 24, 2006, ADAMS Accession No. ML060880442.

28. Letter, George Stramback (GE) to USNRC, CPR Margin – DSS-CD LTR (NEDC-33075P, Detect and Suppress Solution – Confirmation Density), MFN 06-105, April 17, 2006, ADAMS Accession No. ML061100204.

Attachments:
1. Resolution of Comments
2. TER (Proprietary)

Principle Contributors: T. Huang
M. Waterman

Date: November 27, 2006

Table 1. Documentation Reviewed by Staff During First Audit

Document Number/Revision	Date	Document Title	Description
23A5162 Rev 2	10/29/90	NUMAC Software Management Plan	The SMP describes the process to be used for the design, development, and maintenance of NUMAC product software.
No Doc. Number	1/14/99	PRNM NUMAC Problem Report Tracking Matrix	This matrix tracks NUMAC PRNM problems and their resolution. This matrix was provided as an example report illustrating the process by which GE tracks problem resolutions.
23A5163 Rev 2	10/29/90	NUMAC Software Verification and Validation Plan	This document describes the Verification and Validation Plan (VVP) to be used for all NUMAC products. The plan clarifies and/or supplements the Engineering Operating Procedures under which all design work is done. The VVP is designed to work in conjunction with the NUMAC Software management Plan.
23A5161 Rev 1	10/20/90	NUMAC Software Configuration Management Plan	This document describes the Software Configuration Management Plan to be used for all NUMAC products. This plan establishes a formal set of standards and procedures to ensure effective configuration management of NUMAC software products and provide visible status and control of software documentation items.
26A6050 Rev 1	3/21/03	Oscillation Power Range Neutron Monitor for Stability DSS-CD	This specification establishes the performance requirements of the OPRM for the DSS-CD.
26A6050AA Rev 2	3/21/03	Oscillation Power Range Monitor for Stability DSS-CD	This document is the Nuclear Safety Analysis document that defines the requirements basis for the DSS-CDA.

Table 1. Documentation Reviewed by Staff During First Audit

Document Number/Revision	Date	Document Title	Description
GENE 0000-0016-7639	5/14/03	NUMAC Power Range Neutron Monitoring System (PRNM) Operating Experience Feedback and Recommendations Update Report	The purpose of this report is to consolidate the experience information in a single report, update information and recommendations previously provided where applicable, and provide information and recommendations related to issues that have been identified.
3407 Rev 4	7/15/03	Contract N. 2407, Work Authorization No. 3407-4, Change Order No. 3407-4-17	This document is the Brunswick Purchase Order
1208-JXB15-KB0 Rev 1	8/7/03	System Project Plan	This project plan provides the work scope and deliverables for implementation of the new Stability Detect and Suppress Solution - Confirmation Density (DSS-CD) for Brunswick NPP, Units 1 and 2. The DSS-CD will be incorporated into the as-built NUMAC Power Range Neutron Monitor (PRNM) system.
RMCN02681 Rev 0	9/18/03	Brunswick PRNMS Requirements Spec Data Sht 24A5221RM	This document summarizes the basis for each change to the existing Brunswick PRNMS defined by 24A5221RM Rev 3.

Table 2. Requirements Reviewed by Staff

Document No.	Requirement No.	Status	Comments
26A6050AA	3.1, Sht 8 3.2.5, Sht 21	OK	Detection Algorithm Specification. Check the algorithm that enables/disables the OPRM on the basis of reactor power and recirculation flow. Confirm the values for P_b and W_b are in the algorithm shown on Sht 8.
26A6050AA	3.1, Sht 8	OK	Detection Algorithm Specification. Check the process by which the LPRM signals are filtered, combined into OPRM cells, time averaged, and normalized.
26A6050AA	3.2.6, Sht 22	OK	Filters. Review the Filter equations and verify the values of the filter coefficients shown on Sht 22 are in the coding and have been tested.
26A6050AA	3.1.1, Sht 9	OK	Determine Maximum (Peak), Minimum (Valley) and Period. Compare the logic shown on Sht 9 with the coding and verify the testing.

Table 3. Documents Reviewed by Staff During Second Audit

Document Number/Revision	Date	Document Title	Description
1208-JXB15-KB0 Rev 0	7/7/03	Progress Energy Carolinas, Inc., Brunswick Nuclear Plant, Units 1 and 2, NUMAC Power Range Neutron Monitoring System, Implementation of DSS-CD for PRNM, Project Plan (Project Quality Plan/Project Work Plan)	This project plan provides the work scope and deliverables for implementation of the new Stability Detect and Suppress Solution - Confirmation Density (DSS-CD) for Brunswick Nuclear Plant, Units 1 and 2. The DSS-CD will be incorporated into the as-built NUMAC Power Range Neutron Monitor (PRNM) system.
26A6050 Rev 1	7/28/03	Oscillation Power Range Monitor for Stability DSS-CD - Performance Specification	This specification establishes the performance requirements of the OPRM for the DSS-CD.
26A6050AA Rev 4	11/6/03	Oscillation Power Range Monitor for Stability DSS-CD - Data Sheet	This data sheet establishes the ranges and nominal values of the parameters included in the design of the OPRM DSS-CD.
24A5221 Rev 8	7/15/03	NUMAC Power Range Neutron Monitor System Requirements Specification	This specification defines the design and performance requirements for the design and manufacture of a NUMAC based PRNM system.
24A5221RM Rev 4	11/11/03	PRNM Requirements Specification - Data Sheet	This requirements specification data sheet establishes the specific design requirements for the Brunswick 1&2 NUMAC PRNM systems.
26A6192 Rev 0	11/14/03	NUMAC Average Power Range Neutron Monitor with DSS-CD, Performance Specification	This specification defines the performance characteristics and application limits for a generic NUMAC APRM instrument that includes the OPRM DSS-CD and automatic BSP functions.

Table 3. Documents Reviewed by Staff During Second Audit

Document Number/Revision	Date	Document Title	Description
26A6192RM Rev 0	11/14/03	NUMAC Average Power Range Neutron Monitor with DSS-CD, Data Sheet	This performance specification data sheet, in conjunction with the generic specification, 26A6192, Rev. 0, defines the performance characteristics and application limits for the Brunswick 1&2 NUMAC APRM.
26A5772 Rev 4	12/5/03	APRM User's Manual - Performance Specification	This performance specification provides the APRM Instrument description, the function descriptions, and miscellaneous information such as descriptions of the top-level menus, abbreviations and acronyms, and symbols used in the manual.
eDRF 0000-0017-9229 Rev A	11/16/03	APRM (with DSS-CD) Functional Controller Software Design Specification	This document comprises the high-level design of the APRM functional controller software. The purpose of the document is to define the software design in sufficient detail such that software implementation can be undertaken without need for major design decisions. The specification also provides a means for understanding how the functional controller software fulfills design input requirements.
eDRF 0000-0017-9229 Rev A	11/16/03	APRM (with DSS-CD) Functional Controller Software Design Specification Data Sheet	This document describes the Brunswick 1&2 APRM functional controller software design by way of listing the exceptions to the parent document.
Software listing of OPRM.C	12/11/03	Oscillation Monitor Package for NUMAC APRM	This package contains the oscillation monitor task and the procedures necessary to support stability-ASP access.

Table 3. Documents Reviewed by Staff During Second Audit

Document Number/Revision	Date	Document Title	Description
Test Results Reports	10/6/03	N/A	These documents list the test results from the Factory Acceptance Tests.

Table 4. Document No. 26A6050AA FIXED Parameters

Parameter	Definition
T_{min} (sec)	The Period Based Algorithm (PBA) oscillation period lower time limit for anticipated reactor instability. If the time between successive peaks or valleys is less than T_{min}, then it is not indicative of an anticipated reactor instability.
ε_0 (ms)	The PBA period tolerance. This parameter defines the limits within which successive oscillation periods may vary from the first (base) oscillation period in order to increment the number of confirmation counts. If the difference between an oscillation period and the base period is not within this tolerance, the number of confirmation counts is reset to zero.
M_{AX}	An OPRM configuration constant representing maximum number of OPRM cells along an instability symmetry axis.
N_P[1]	Period Based Detection Algorithm (PBDA) successive confirmation count setpoint. After a base period is established, the period confirmation count is increased by one (1) each time a valley or peak meets the PBA confirmation criteria. Reaching N_P is indicative of reactor instability.
S_P[1]	PBDA amplitude trip setpoint. When the cell exceeds S_P after the confirmation count has reached N_P, ASF (automatic suppression function) is required.
N_{Th}	CDA successive confirmation count setpoint. The DSS-CDA initiates a reactor trip when the number of successive confirmation counts exceeds this value.
$LPRM_{min}$	The minimum number of operable LPRM input signals to an OPRM cell for the OPRM cell to be considered operable. Cell sensitivity generally increases with fewer operable LPRMs.
f_c (Hz)	Filter cutoff frequencies (Hz) for the conditioning filters to remove high frequency noise from the LPRM signals and to time average the LPRM signals.
P_b	OPRM Armed Region Lower Power Boundary (% Rated Power). The Simulated Thermal Power (STP) from the APRM channel is used to provide the power level. P_b is set to the % rated power level corresponding to the MCPR Monitoring Threshold.
W_b	OPRM Armed Region Upper Flow Boundary (% Rated drive flow). The total recirculation flow (average of both loops) from the APRM channel is used to provide the recirculation drive flow. W_b is set to 70% rated drive flow for MELLLA operation and 75% rated drive flow for MELLLA+ operation.

Note: 1. The PBDA is not credited in the system licensing basis.

Table 5. Document No. 26A6050AA ADJUSTABLE Parameters

Parameter	Definition
N_{AL}	Successive confirmation count alarm setpoint for the CDA.
AL	Flag used to establish the OPRM cell on which the PBA/CDA alarm is based. A value of 1 for AL bases the PBA/CDA alarm on any one OPRM cell exceeding a successive confirmation count of N_{AL}. A value of 2 for AL bases the PBA/CDA alarm on the second OPRM cell exceeding a successive confirmation count of N_{AL}.
m[1]	Slope of the automatic Backup Stability Protection (BSP) APRM flow biased trip and rod block setpoint linear segments. m is set at an approximate typical flow control line value.
$P_{BSP\text{-}Trip}$[1]	Automatic BSP APRM flow biased trip setpoint power intercept (% Rated power). The STP from the APRM channel is used to provide the power level. $P_{BSP\text{-}Trip}$ is set at or below the BSP Region I intercept at the plant natural circulation line.
$P_{BSP\text{-}RB}$[2]	Automatic BSP APRM flow biased rod block setpoint power intercept (% Rated power). The STP from the APRM channel is used to provide the power level. $P_{BSP\text{-}RB}$ is set below $P_{BSP\text{-}Trip}$ based on plant specific operational and setpoint methodology considerations.
$W_{BSP\text{-}Trip}$[1]	Automatic BSP APRM flow biased trip setpoint drive flow intercept (% Rated drive flow). The total recirculation flow (average of both loops) from the APRM channel is used to provide the recirculation drive flow. $W_{BSP\text{-}Trip}$ is selected such that the BSP Region I is bounded by the APRM flow biased trip setpoint.
$W_{BSP\text{-}RB}$[2]	Automatic BSP APRM flow biased rod block setpoint drive flow intercept (% Rated drive flow). The total recirculation flow (average of both loops) from the APRM channel is used to provide the recirculation drive flow. $W_{BSP\text{-}RB}$ is set above $W_{BSP\text{-}Trip}$ based on plant specific operational and setpoint methodology considerations.

Notes:
1. Although this value is characterized by GE as an ADJUSTABLE value, if the BSP trip function is credited as a licensing basis system, this value must be controlled consistent with the guidance provided by GE.
2. Rod block limits are not licensing basis limits.

RESOLUTION OF COMMENTS ON DRAFT SAFETY EVALUATION FOR NEDC-33075P, "GENERAL ELECTRIC BOILING WATER REACTOR DETECT AND SUPPRESS SOLUTION - CONFIRMATION DENSITY"

By e-mails dated August 14, 17, and 22, 2006, (ADAMS Accession Nos. ML062780046, ML062780050, and ML062780048, respectively) General Electric Nuclear Energy (GENE) provided comments on the draft safety evaluation (SE) for NEDC-33075P. The following is the NRC staff's resolution of these comments.

GENE Comment:

Page 1 title - wrong topical referenced.

NRC Resolution:

Replaced NEDC-32938P with correct title NEDC-33075P.

GENE Comment:

Page 1 misspelled "safety limit minimum critical for power (SLMCPR)."

NRC Resolution:

Replaced "safety limit minimum critical for power (SLMCPR)" with "safety limit minimum critical power ratio (SLMCPR)."

GENE Comment:

In Section 3.6.3, GENE noted that one of the parameters was incorrectly labeled and also clarified the description of the parameters.

NRC Resolution:

The NRC staff agrees with GENE's comments and have revised Section 3.6.3 to read:

"These parameters are ADJUSTABLE parameters. Although GE characterizes these parameters as ADJUSTABLE, since the BSP trip function is credited as a licensing basis system, the value of these parameters are controlled and can only be changed with guidance provided by GE.

On the basis of the above parameter definitions, the NRC staff concluded that the FIXED parameter values N_{Th}, P_b, W_b, T_{min}, ε_0, M_{AX}, $LPRM_{min}$, and f_c, and the ADJUSTABLE parameter values m, $P_{BSP\text{-}Trip}$, and $W_{BSP\text{-}Trip}$ are licensing basis values, and should be controlled as such by licensees using the DSS-CD trip function, and, as appropriate, the BSP trip function."

GENE Comment:

GENE has noted that Conclusion 3 needs to be clarified.

NRC Resolution:

The NRC staff has reviewed the comment and agrees. As such conclusion 3 has been clarified as such:

"The existing Solution III is already approved for plant operation up to 20 percent EPU. DSS-CD is an extension of Solution III, where the need to determine the PBDA scram setpoint with a DIVOM correlation is eliminated by setting the setpoint to the Amplitude Discriminator value (i.e., coherent oscillations just above a nominal noise level will result in an automated scram). Thus, DSS-CD is, in essence, a Solution III implementation with the PBDA setpoint set at very conservative setting. Therefore, the NRC staff concludes that DSS-CD is a technically acceptable methodology for any reactor operating up to EPU conditions."

GENE Comment:

GENE noted that Conclusion 13 and Tables 4 and 5 needed to be corrected to reflect the mislabeled parameter in Section 3.6.3.

NRC Resolution:

The NRC staff agrees with GENE's comment and has revised Conclusion 13 and the associated Tables 4 and 5 to reflect the mislabeled parameter.

GENE Comment:

GENE noted that in Section 3.2 could imply that the DSS-CD SE is pending the approval of the TRACG topical report.

NRC Resolution:

The NRC staff agrees with GENE's comment and has revised Section 3.2 to state:

"Therefore, the TRACG calculations in Section 4 of NEDC-33075P, Revision 5, are acceptable for this evaluation. An SE for the DSS-CD TRACG application will be issued separately, but is not required for implementing the DSS-CD LTR."