NRC Staff Exhibit C

5

March 31, 2003

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

SUBJECT: REVIEW OF GE NUCLEAR ENERGY LICENSING TOPICAL REPORT, NEDC-33004P, REVISION 3, "CONSTANT PRESSURE POWER UPRATE" (TAC NO. MB2510)

Dear Mr. Klapproth:

By letter dated February 6, 2003, which incorporates Errata and Addenda 1, GE Nuclear Energy (GENE) provided a revised Constant Pressure Power Uprate (CPPU) licensing topical report (LTR) documenting the basis for the approach to be used for GE-prepared BWR constant pressure power uprate safety analysis reports. The revision addresses NRC's concerns stated in a letter dated August 12, 2002, withdrawing our safety evaluation (SE) approving the use of the CLTR. The NRC has considered this request and with the exception of the proposed elimination of large transient testing, has approved the use of this LTR. The staff intends to issue a supplement to the SE when the large transient testing guidance is available.

Licensees proposing to reference the CPPU LTR as a basis for a power uprate license amendment request and proposing to obtain a license amendment to incorporate one or more of the plant changes mentioned in the seven restrictions applicable to the CPPU LTR must first request and obtain a license amendment for the associated change in accordance with the CPPU LTR. The one exception is with regards to a source term methodology change. A licensee may submit and the NRC staff will review a source term methodology change, in lieu of the analysis in Section 9.2 of the CPPU LTR, concurrent with the power uprate request, if the source term submittal supports operation at the uprated power level. Licensees proposing to utilize fuel designs other than GE fuel, up through GE 14 fuel, may not reference the CPPU LTR as a basis for their power uprate since the CPPU LTR process applies only to GE fuel and GE accident analysis methods. However, such licensees may reference the CPPU LTR for areas other than those involving reactor systems and fuel issues which are not impacted by the fuel design. Licensees should afford the staff sufficient time to complete its review of all associated licensing basis changes prior to submittal or request for the implementation of the power uprate when referencing the CPPU LTR.

The staff finds that the subject topical report is acceptable for referencing in licensing applications to the extent specified under the limitations delineated in the report and in the associated NRC safety evaluation. The enclosed safety evaluation defines the basis for acceptance of the CPPU LTR. As discussed in Section 10.5 of the safety evaluation, the staff is preparing guidance to generically address the requirement for conducting large transient tests in conjunction with power uprates. Therefore, the staff is not prepared to accept, on a

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generic basis, the proposed elimination of these tests. The staff intends to issue a supplement to this safety evaluation when the guidance is available.

We do not intend to repeat our review of the matters described in the subject report, and found acceptable, when the report appears as a reference in license applications, except to ensure that the material presented applies to the specific plant involved. Our acceptance applies only to matters approved in the report.

In accordance with the guidance provided on the NRC website, we request that GENE publish an accepted version within three months of receipt of this letter. The accepted version shall incorporate (1) this letter and the enclosed SE between the title page and the abstract, and (2) a "-A" (designating "accepted") following the report identification symbol.

If the NRC's criteria or regulations change so that its conclusion in this letter that the topical report is acceptable is invalidated, GENE and/or the applicant referencing the topical report will be expected to revise and resubmit its respective documentation, or submit justification for the continued applicability of the topical report without revision of the respective documentation.

Pursuant to 10 CFR 2.790, we have determined that the safety evaluation provided as Enclosure 1 contains proprietary information. Proprietary information contained in Enclosure 1 is indicated by double underlines. We have prepared a non-proprietary version of the safety evaluation (Enclosure 2) that we have determined does not contain proprietary information. However, we will delay placing Enclosure 2 in the public document room for a period of ten (10) working days from the date of this letter to provide you with the opportunity to comment on the proprietary aspects only. If you believe that any information in Enclosure 2 is proprietary, please identify such information line by line and define the basis pursuant to the criteria of 10 CFR 2.790.

If you have any questions, please contact Alan Wang, GENE Project Manager, at (301) 415-1445.

Sincerely,

/RA/

William H. Ruland, Director
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Project No. 710

Enclosures: 1. Proprietary Safety Evaluation
2. Non-Proprietary Safety Evaluation

cc w/encl. 2: See next page

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GE Nuclear Energy

Project No. 710

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TABLE OF CONTENTS

<u>LIST OF ACRONYMS</u>

AC	- alternating current
ACP	- activated corrosion products
ADS	- automatic depressurization system
ALARA	- as low as is reasonably achievable
ANSI	- American National Standards Institute
AOO	- anticipated operational occurrence
AOP	- abnormal operating procedure
APRM	- average power range monitor
ARI	- alternate rod insertion
ART	- adjusted reference temperature
ASME	- American Society of Mechanical Engineers
AST	- alternate source term
ATWS	- anticipated transient without scram
AV	- allowable value
BOP	- balance of plant
BHP	- brake horse power
BWR	- boiling water reactor
BWRVIP	- Boiling Water Reactor Vessel and Internals Project
CCW	- component cooling water
CDF	- core damage frequency
CFDS	- condensate filtration and demineralization system
CGCS	- combustible gas control system
COLR	- Core Operating Limits Report
CPPU	- constant pressure power uprate
CRD	- control rod drive
CRDA	- control rod drop accident
CRDM	- control rod drive mechanism
CS	- containment spray
CSC	- containment spray cooling
CST	- condensate storage tank
DBA	- design-basis accident
DC	- direct current
ECCS	- emergency core cooling system
EMA	- equivalent margins analysis
EOP	- emergency operating procedure
EPU	- extended power uprate
EQ	- environmental qualification
ESFAS	- engineered safety feature actuation system
FAC	- flow accelerated corrosion
FHA	- fuel handling accident
FIV	- flow induced vibration
FW	- feedwater
GDC	- general design criteria
GENE	- GE Nuclear Energy
GESTAR II	- General Electric Standard Application for Reactor Fuel
GL	- generic letter

GNF	- Global Nuclear Fuel
HCU	- hydraulic control unit
HELB	- high energy line break
HPCI	- high pressure coolant injection
HPCS	- high pressure core spray
HWC	- hydrogen water chemistry
IASCC	- irradiation assisted stress corrosion cracking
ICA	- interim corrective action
ILBA	- instrument line break accident
IORV	- inadvertent opening of a relief valve
IPE	- individual plant examination
IPEEE	- individual plant examination of external events
LTR	- licensing topical report
LHGR	- linear heat generation rate
LOCA	- loss of coolant accident
LTS	- long term solution
LOFW	- loss of feedwater
LOFWF	- loss of feedwater flow
LPCI	- low pressure coolant injection
LPCS	- low pressure core spray
LERF	- large early release frequency
LOOP	- loss of offsite power
MELLLA	- maximum extended load limit line analysis
MEOD	- maximum extended operating domain
MCPR	- minimum critical power ratio
MAPLHGR	- maximum average planar linear heat generation rate
MSLBA	- main steam line break accident
MSIV	- main steam isolation valve
MVAR	- reactive power
MOS	- main offgas system
NSSS	- nuclear steam supply system
NPSH	- net positive suction head
NMIP	- noble metals injection process
OLTP	- original licensed thermal power
OLMCPR	- operating limit minimum critical power ratio
OPRM	- oscillation power range monitor
PUSAR	- power uprate safety analysis report
PRFO	- pressure regulatory failure to open
P-T	- pressure temperature
PCT	- peak cladding temperature
PRA	- probabilistic risk assessment
RPT	- reactor pressure temperature
RHR	- residual heat removal
RCS	- reactor coolant system
RIPD	- reactor internal pressure differences
RPV	- reactor pressure vessel
RCPB	- reactor coolant pressure boundary
RCIC	- reactor core isolation cooling
RWCU	- reactor water cleanup

RCIS	- rod control and information system
RTP	- rated thermal power
RWL	- rod withdrawal limiter
RPS	- reactor protection system
SE	- safety evaluation
SRLR	- Supplemental Reload Licensing Report
SAFDL	- specified acceptable fuel design limit
SLMCPR	- safety limit minimum critical power ratio
SBO	- station blackout
SRV	- safety relief valve
SRP	- Standard Review Plan
SCCR	- spent condensate cleanup resins
SLC	- standby liquid control
SPC	- suppression pool cooling
SDC	- shutdown cooling
SGTS	- standby gas treatment system
STS	- standard technical specifications
TAF	- top-of-active fuel
TTNBP	- turbine trip no bypass
TCV	- turbine control valve
TS	- technical specification
UFSAR	- updated final safety analysis report
USE	- upper shelf energy

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

GE NUCLEAR ENERGY LICENSING TOPICAL REPORT

NEDC-33004P, REVISION 1

"CONSTANT PRESSURE POWER UPRATE"

PROJECT NO. 710

1.0 OVERVIEW

1.1 Introduction

By letter dated March 19, 2001 (Reference 1), GE Nuclear Energy (GENE) submitted Licensing Topical Report (LTR) NEDC-33004P, "Constant Pressure Power Uprate" (CPPU) for NRC review and approval. The CPPU LTR proposes a simplified process for achieving extended power uprates (EPU). Following meetings with the NRC staff on June 13, 2001, and July 17, 2001, GENE submitted Revision 1 of the CPPU LTR by letter dated July 26, 2001 (Reference 2). After initial staff review, a meeting was held on September 26, 2001, to discuss staff questions. The staff review of the CPPU LTR was performed in conjunction with ongoing reviews and audits of recent EPU requests that used elements of the constant pressure uprate approach. GENE submitted responses to the staff's request for additional information (RAI) on December 3, 18, and 21, 2001 (References 3, 4, and 5). GENE also submitted an update (errata and Addenda 1) to the CPPU LTR on December 21, 2001 (Reference 6) to provide consistency with the RAI responses and to provide additional improvements and corrections which summarized discussions with the NRC staff. The CPPU LTR submittal and the supplemental supporting documentation regarding the revised constant pressure EPU approach have been reviewed by the staff. A portion of the staff's review was performed during on-site audits of the GENE/Global Nuclear Fuel (GNF) safety analyses performed for power uprate safety analysis reports (PUSAR) supporting recent licensee EPU amendment requests.

On June 20, 2002, the staff issued its safety evaluation (SE) regarding NEDC-33004P, Revision 1 to GENE with a 10-day hold before release to the public. We informed you that this was to provide GENE an opportunity to comment on the proprietary aspects before making the SE public. In subsequent calls with your staff, GENE informed the NRC staff that they had substantive concerns regarding the content of the SE. By letter dated July 18, 2002, GENE formally documented their comments regarding the proprietary and technical content of the SE.

During a meeting with the Browns Ferry licensee on July 10, 2002, the staff learned that GENE and TVA intended to apply the CPPU LTR in a way that did not reflect the NRC staff's understanding and basis for the acceptability of the topical report for licensing applications. In telephone discussions with GENE on July 15 and 22, 2002, the staff confirmed that our understanding about the manner in which the CPPU topical report could be applied and the restrictions on the use of the CPPU topical report is significantly different from GENE's.

OM-S/G-1997 Code, "Requirements for Pre-Operational and Initial Startup Vibration Testing of Nuclear Power Plant Piping," and therefore, acceptable.

3.4 Piping Systems and Components

The piping evaluation addresses the effects of CPPU due to increased flow rate, temperature and pressure on the RCPB and the BOP piping systems and components. The components evaluated included equipment nozzles, anchors, guides, penetrations, pumps, valves, flange connections, and pipe supports (including snubbers, hangers, and struts). The RCPB piping systems consist of safety-related piping subsystems that move fluid through the reactor and other safety systems. The BOP piping systems consist of piping subsystems that move fluid through systems that are not evaluated in conjunction with the RCPB piping systems.

The RCPB piping evaluations compare the changes in the design parameters such as flow, pressure, temperature, and mechanical loads between the current existing design basis and the CPPU conditions. For most RCPB piping systems such as the [ ], these design parameters will not increase. Consequently, there will be no change in pipe stress, pipe support loads (snubbers, hangers), and fatigue evaluations. For other safety-related piping systems such as the main steam, feedwater piping and associated branch piping as well as safety-related thermowells that are significantly affected by CPPU, an increase in the flow, pressure, temperature and mechanical loads will be evaluated [ ] consistent with the methods specified in Appendix K of ELTR1. Plant-specific evaluations are required to demonstrate that the calculated stresses and fatigue usage factors are less than the code allowable limits in accordance with the requirements of the applicable code of record in the existing design basis stress report. As such, the staff concludes that, where required, plant-specific analysis for CPPU would provide the basis to ensure that the RCPB piping systems and supports will continue to meet the code requirement and maintain the structural and pressure boundary integrity at the CPPU condition.

The evaluation of the BOP piping and appropriate components, connections and supports will be performed in a manner similar to the evaluation of the RCPB piping systems and supports. Results of the evaluation will be compared to the allowable limits in the original code of record such as ASME Code Section III. No new assumptions were introduced that were not included in the original analyses. In cases where the Code allowable values are not satisfied, detailed analyses or field modifications can be completed such that Code requirements are met. Pipe break locations and pipe whip restraint hardware capacities are also evaluated to demonstrate acceptability. The existing design analyses of the affected BOP piping systems were assessed on a plant-specific basis using applicable ASME Section III, Subsections NB/NC/ND or B31.1 Power Piping Code equations. The original codes of record (as referenced in the appropriate calculations), code allowable values, and analytical techniques will be used. The plant-specific evaluations will be performed to demonstrate that the calculated stresses and fatigue usage factors are less than the allowable limits in accordance with the requirements of the applicable code of record in the existing design basis stress report. As such, the staff concludes that the plant-specific analysis for the BOP piping systems would provide the basis to ensure that BOP piping will continue to maintain its structural and pressure boundary integrity at the CPPU condition.

A [ ] evaluation will be performed to address the effects of CPPU on the capacity and performance of safety and relief valves, air-operated-valves, motor-operated-valves and other safety-related valves. In its response to the staff RAI, dated December 18, 2001

(Reference 4), GENE required the plant-specific assessment to include consideration of GL 95-07, "Pressure Locking and Thermal Binding of Safety Related Power Operated Gate Valves," in addition to the assessment items associated with the evaluation of the containment system. Other evaluations include effects of CPPU on the plant-specific response and commitments to GL 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," for the plant MOV program and GL 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," for the overpressurization of penetration piping segments. The staff agrees with the CPPU LTR requirement to perform plant-specific evaluations relating to GL 89-10, GL 95-07 and GL 96-06 in consideration of CPPU.

On the basis of the above review, the staff concludes that although the method for the evaluation is consistent with Appendix K of ELTR1, the adequacy of affected piping, piping components, and their supports will be dependent on the plant-specific design and as-built information to demonstrate the structural and pressure boundary integrity of the RCPB and BOP piping systems and supports for the CPPU condition.

3.5 Main Steam Flow Restrictors

At normal operation, the main steam flow restrictors are required to pass a higher CPPU flow rate, which will result in an increased pressure drop. For the faulted condition with a postulated steam line break outside containment, the fluid flow in the broken steam line increases until it is limited by the main steam line flow restrictor. Because the maximum operating dome pressure does not change, [.] Therefore, the main steam flow restrictors [.] Because the flow restrictors were designed and analyzed for the choked flow condition with the maximum pressure difference, which is bounding for the CPPU condition, the CPPU LTR concludes that the structural integrity of flow restrictors [.] The staff agrees with this conclusion.

Because the maximum operating pressure of the reactor steam dome will not change, the maximum flow rate through the flow restrictor is unchanged from the current analysis. Therefore, values from the current analysis for steam line break flow remain valid for uprate conditions.

3.6 Reactor Recirculation System

The primary function of the recirculation system is to vary the core flow and power during normal operation. However, the recirculation system also forms part of the reactor coolant system (RCS) pressure boundary.

The plant licensee must evaluate the changes in the system operating pressure and temperature at the CPPU conditions to either confirm that changes are small and result in conditions that remain within the current rated conditions, or to reevaluate. The CPPU will not result in an increase in the steady-state dome pressure. However, operation at the CPPU power level may increase the two-phase core flow resistance, requiring a slight increase in the recirculation system drive flow. The required pump head and pump flow at the CPPU conditions may increase the power demand of the recirculation motors slightly. CPPU does not generally require changes to the recirculation flow control system. The recirculation system evaluations should be consistent with the generic evaluation in ELTR2. Section 4.5 of the scope, level of detail, and quality of the PRA and other relied upon risk-related evaluations (e.g., seismic margins analysis) used to support the licensee's determination that the risk impacts associated with CPPU are acceptably small for internal events, external events, and shutdown operations.

The scope, level of detail, and quality of the licensee's plant-specific PRA and other risk-related evaluations used to support a CPPU license application should be commensurate with the application for which it is intended and the role that the PRA results play in the utility's and staff's decision-making process and should be commensurate with the degree of rigor needed to provide a valid technical basis for the staff's decision. To determine that the PRA used in support of the license application is of sufficient quality, scope, and level of detail, the staff will evaluate the information provided by the licensee in plant-specific submittals using the guidance provided in RG 1.174, as well as consider the staff's previous reviews on the licensee's individual plant examination (IPE) and IPEEE submittals and the conclusions and findings of any industry or independent peer reviews. Therefore, the licensee should discuss how the process used to update and maintain the PRA and supporting analyses (e.g., thermal hydraulic calculations) would ensure that they are representative of the as-built, as-operated plant and should discuss any previously identified weaknesses, review findings, and conclusions on the IPE and IPEEE, up through the current PRA model, to ensure that they have been adequately considered and addressed in the CPPU analyses. The licensee's information needs to be sufficient for the staff to conclude that the PRA and other relied upon risk-related evaluations adequately reflect the as-built, as-operated plant for the specific CPPU license application.

10.4.5 Conclusions

Based on the staff's review of the PRA section of the CPPU LTR, as modified by the GENE responses to the staff's requests for additional information, the staff finds this section acceptable for use by licensees as the overall, high-level guidance for the plant-specific submittals of PRA information in support of CPPU license applications. However, the staff notes that in this section of the CPPU LTR, evaluations were dispositioned as being completely plant-specific and the staff recognizes that GENE has created a submittal shell report, based on their experience with prior extended power uprate reviews, to aid licensees in providing the proper level of detail and quality of information to address the plant-specific risks associated with a CPPU. The staff expects GENE to continue to use and improve upon this shell report to support the licensee's plant-specific submittals by proactively addressing the risk-related issues and topics that have previously been raised by the staff for extended power uprates.

The staff further notes that it will use the guidelines delineated in RG 1.174 to focus its evaluation of the plant-specific risk impacts associated with a licensee's CPPU license application. This evaluation will include a review of the CPPU impacts to CDF and LERF due to internal events, external events, and shutdown operations. The staff evaluation will also address the quality of the licensee's plant-specific PRA and other relied upon risk-related evaluations that are used to support the licensee's analyses and conclusion that the risk impacts associated with a CPPU are acceptable.

10.5 Testing

The "Testing" section of the CPPU LTR states that testing is required for the initial power ascension following the implementation of CPPU, [

.] The CPPU LTR establishes a standard set of tests for the initial power ascension steps of CPPU. [

.]

10.5.1 Testing Program

The following power increase-testing, which supplements normal TS testing, is provided in the CPPU LTR:

- Testing will be done in accordance with TS surveillance requirements on instrumentation that is re-calibrated for CPPU conditions. Overlap between the intermediate range monitor and the APRM will be assured.

- Steady-state data will be taken at points from 90 percent up to 100 percent of the pre-uprated thermal power so that system performance parameters can be projected for CPPU conditions before the pre-uprated power rating is exceeded.

- Power increases will be made along an established flow control/rod line in increments of less than or equal to 5 percent power. Steady-state operating data, including fuel thermal margin, will be taken and evaluated at each step. Routine measurements of reactor and system pressures, flows and vibration will be evaluated from each measurement point prior to the next power increment. Radiation measurements will be made at selected power levels to ensure the protection of personnel.

- Control system tests will be performed for the feedwater/reactor water level controls, pressure controls, and recirculation flow controls, if applicable. These operational tests will be made at the appropriate plant conditions for that test at each power increment, to show acceptable adjustments and operational capability.

- Testing will be done to confirm the power level near the turbine first-stage scram and recirculation pump trip bypass setpoint.

The same performance criteria will be used as in the original power ascension test unless they have been replaced by updated criteria since the initial test program. [

.]

10.5.2 Large Transient Tests

In the CPPU LTR, GENE proposed that large transient tests (MSIV closure and generator load rejection tests similar to those conducted during initial plant startup) included in the NRC-approved topical report ELTR1 not be performed for CPPU. ELTR1 includes the MSIV closure test for power uprates greater than 10 percent above any previously recorded MSIV closure transient data and the generator load rejection test for power uprates greater than 15 percent above any previously recorded generator load rejection transient data. GENE provided justification for not performing these tests and concluded that they are not needed to demonstrate the safety of plants implementing a CPPU.

In evaluating GENE's justification not to perform the two large transient tests, the staff considered: (1) the modifications made to the plant for a CPPU that are related to the two tests, (2) component and system level testing that will be performed either as part of the licensee's power ascension and test plan or to meet TS surveillance requirements, (3) past experience at other plants, and (4) the importance of the additional information that could be obtained from performing the two tests with respect to plant analyses.

10.5.3 Transient Tests and Modifications

Large transient testing is normally performed on new plants because experience does not exist to confirm a plant's operation and response to events. However, these tests are not normally performed for plant modifications following initial startup because of well-established quality assurance and maintenance programs including component and system level post- modification testing and extensive experience with general behavior of unmodified equipment. When major modifications are made to the plant, large transient testing may be needed to confirm that the modifications were correctly implemented. However, such testing should only be imposed if it is deemed necessary to demonstrate safe operation of the plant.

GENE stated that large transient tests only challenge a limited set of systems and components and provided information regarding such systems. This situation results because the scram rapidly reduces power and the long-term consequences are relatively benign and controlled by normal operator actions. For example, the system requirements for the required actions for the closure of all MSIVs and load rejection are limited to the following:

Closure of all MSIVs	Systems Challenged
[	
	]

Load Rejection	Systems Challenged
[	
	]

The instrumentation that initiates these actions is also included in the list of required functions. The only other components that have a significant effect on these transients are [

.] Since feedwater flow for normal operation is significantly greater than that required to restore water inventory and for decay heat removal following a scram, a large transient test is not required.

[

.]

10.5.4 Other Testing

Regarding the testing requirements for the required systems other than feedwater, GENE provided a list of applicable requirements in the Standard Technical Specifications (STS) that are representative of a typical plant's testing requirements. The feedwater system is a normal operating system and its normal operating requirements are more demanding than requirements for these transient tests. The STS system/component test requirements are:

System	Technical Specification Surveillance
[	
	]

GENE concluded that meeting these TS requirements is sufficient to demonstrate the system and/or component initiation setpoint and performance characteristics. [

.]

10.5.5 Experience

GENE provided information on testing and or events that occurred at previously uprated BWR plants. Tests were performed at a foreign plant to demonstrate modifications made to its system to enable it to successfully avoid a scram during a turbine trip or generator load rejection transient from full power. These tests involved turbine trips at 110.5 percent OLTP and 113.5 percent OLTP and a generator load rejection test at 104.2 percent OLTP. The testing demonstrated the performance of equipment that was modified in preparation for higher power levels. Equipment that was not modified performed as before. The reactor vessel pressure was controlled at the same operating point for all the tests. No unexpected performance was observed except in the fine-tuning of the turbine bypass opening that was done as the series of tests progressed. These large transient tests at the foreign plant demonstrated the response of the equipment and the reactor response. The observed response closely matched the predicted response from which GENE concluded that the licensing analyses for uprated conditions reflected the behavior of the plant.

The three unplanned transients at BWR plants included two load rejections and a turbine trip subsequent to power uprate. In each case the licensee concluded that no anomalies were seen in the plant's response to these events, and the behavior of the primary mitigation systems was as expected. No new plant behavior was observed.

10.5.6 Safety Analyses and Mitigation Capability

GENE maintains that the database on large transient testing is extensive. All plants performed a rapid pressurization transient test at essentially the OLTP during initial startup testing. The purpose of the test was primarily to demonstrate the installed systems' mitigation capability. In addition, it provided a substantial amount of information used for transient model qualification for the specific plant systems' performance. To further support transient model qualification, separate transient testing was performed. These tests were designed to capture the important transient effects. These tests provide the primary test data used in the development of all current BWR transient analysis models used for the simulation of rapid pressurization transients such as the MSIV closure and generator load rejection.

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10.5.7 New Systems or Features

GENE has concluded that current power uprate experience has demonstrated that new systems or features are not required to mitigate the consequences of rapid pressurization transients. Therefore, for the typical CPPU, there is no need to perform large transient testing to test new systems or features. [.]
In addition, GENE has committed that, if a new system or feature is required to mitigate a rapid pressurization event for CPPU, its need will be documented in the plant-specific PUSAR. [

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10.5.8 Staff Evaluation

Section 50.92, "Issuance of amendment" states, in part, that for the determination of issuing amendments, the Commission will be guided by the considerations which govern the issuance of initial licenses or construction permits to the extent applicable and appropriate.

Section 50.34, "Contents of Applications: Technical Information" addresses initial licenses. It requires, in part, that a licensee include the principal design criteria in the safety analysis. The Introduction to 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," states that these principal design criteria are to establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety.

Regarding testing and as stated in RG 1.68, "Initial Test Programs for Water-Cooled Nuclear Power Plants," the primary objectives of a suitable test program are to:

(1) Provide additional assurance that the facility has been adequately designed and, to the extent practical, to validate the analytical models and to verify the correctness or conservatism of assumptions used for predicting plant responses to anticipated transients and postulated accidents, and

(2) Provide assurance that construction and installation of equipment in the facility have been accomplished in accordance with design. The staff based its acceptance of the CPPU testing program on these objectives.

The staff is developing guidance to generically address the requirement for conducting large transient tests in conjunction with power uprates. Therefore, the staff is not prepared to accept the proposed elimination of large transient tests for CPPU. The staff intends to issue a supplement to this safety evaluation when the guidance is available. As part of the PUSAR, the plants will address this subject.

10.5.9 Conclusion

ELTR1 has been accepted by the NRC as the review basis for EPU amendment requests. The CPPU LTR also includes [ ] guidelines for testing, but has eliminated the recommendation in ELTR1 to perform large transient tests. The staff has previously accepted not performing these tests on a plant-specific basis. However, the staff is developing guidance to generically address the requirement for conducting large transient tests in conjunction with power uprates. Therefore, the staff is not prepared at this time to accept the proposed elimination of large transient tests for CPPU.

The staff finds that the performance of numerous component, system, and other testing, in combination with the evaluation of the systems and components and operating experience discussed above, is sufficient to satisfactorily demonstrate successful plant modifications and performance. The staff also finds that information obtained from the MSIV closure and generator load rejection tests could be useful to confirm plant performance, adjust plant control systems, and enhance training material. However, the staff will consider, on a plant-specific basis, the need to conduct these tests (i.e., the risk due to potential random equipment failures during the test); and the additional burden that would be imposed on the licensee.

The staff concludes that the GENE test program, with the exception of the proposal to eliminate large transient testing (i.e., MSIV closure and turbine generator load rejection), meets the objectives of a suitable test program in that the testing included in the program provides additional assurance that the CPPU design is adequate and it provides assurance that the modifications and installation of equipment as part of a CPPU is accomplished in accordance with design.

10.6 Human Factors Evaluation

The staff reviewed the CPPU LTR and the additional information provided by letter dated December 3, 2001, in the area of human factors and operator response considerations.

10.6.1 Operator Response

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Based on PRA experience for uprated BWRs, some effect is expected on PRA results such as CDF and LERF. The CPPU effect will be determined when the plant-specific PRA is revised. GENE has dispositioned operator response as plant-specific. In their December 3, 2001, letter, GENE provided additional information stating that GENE will update the CPPU PUSAR shell document to indicate that the expected level of detail for a plant-specific submittal would be as follows:

- Explain and justify any changes in plant risk that result from changes in risk-important operator actions.
- Describe any new risk-important operator actions required as a result of the proposed power uprate and changes (e.g., reduced time available or additional time required) to any current risk-important operator actions that will occur as a result of the power uprate.
- Describe the specific procedural steps involved in these actions.
- Address any operator workarounds that might affect these response times.
- Identify any operator actions that are being automated as a result of the power uprate.

The staff concludes that the effect of CPPU on operator response and plant risk is plant-specific. Licensees applying for CPPU should provide plant-specific information as described above and in the GENE PUSAR shell.

10.6.2 Operator Training

The CPPU LTR states that classroom training will address "various aspects of CPPU" and provides examples. [.] In Attachment 1 to their December 3, 2001 letter, GENE provided additional information to clarify that the examples cited in the LTR are provided for information only and not as a plant-specific commitment. GENE also noted that changes to operator training are considered as part of the