STP Nuclear Operating Company

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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

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South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Revised Request for Exemption to Exclude Certain Components
From The Scope of Special Treatment Requirements Required by Regulations

Reference 1: Draft Safety Evaluation on Exemption Requests from Special Treatment Requirements of 10CFR Parts 21, 50, and 100 (TAC Nos. MA6057 and MA6058), dated November 15, 2000

In Reference 1, the Nuclear Regulatory Commission (NRC) responded to the STP Nuclear Operating Company's (STPNOC) request for an exemption from various special treatment requirements found in the regulations. The NRC response, via a Draft Safety Evaluation Report, included sixteen Open Items and two Confirmatory Items in the body of the response. STPNOC has previously forwarded responses to 8 of the Open Items and 2 Confirmatory Items. STPNOC now encloses the remaining responses which includes replies to Open Item 3.5, Open Item 4.1, Open Item 4.2, Open Item 8.1, Open Item 10.1, Open Item 10.2, Open Item 11.1, and Open Item 18.1.

Attachment 1	Open Item 3.5
Attachment 2	Open Item 4.1
Attachment 3	Open Item 4.2
Attachment 4	UFSAR 13.7
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Attachment 6	Open Item 10.1/ 10.2
Attachment 7	Open Item 8.1
Attachment 8	Open Item 18.1
Attachment 9	Risk Informed Exemption for Seismic and Environmental Qualification

If you have any questions, please call Mr. Glen E. Schinzel at 361-972-7854 or me at 361-972-8757.

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Attachment 1

Open Item 3.5: STPNOC needs to provide sufficient risk-informed justification for application of the categorization process to passive functions (i.e., structural integrity, pressure boundary) of safety-related SSCs. For example, the staff has determined that the categorization process is not sufficiently robust to support the requested exemption from ASME Section XI Inservice Inspection requirements.

Response:

STPNOC has two risk-informed categorization processes applicable to the pressure boundary and structural integrity functions of SSCs. The first categorization process is the process described in STPNOC's exemption request for plant SSCs. The second is a risk ranking process established in conjunction with the NRC-approved relief request for risk-informed inservice inspection (RI-ISI) for ASME Class 1 pipe welds under NRC Regulatory Guide 1.178, "An Approach for Plant-Specific Risk-Informed Decisionmaking: Inservice Inspection of Piping,"

The RI-ISI risk ranking process is based upon the EPRI methodology for RI-ISI. In the first quarter of 2001, STPNOC anticipates that it will submit a similar request based on this EPRI methodology for risk informing the ISI program for Class 2 pipe welds and Class 1 socket welds under Regulatory Guide 1.178. STPNOC currently has no plans to submit a relief request for RI-ISI for Class 3 components.

STPNOC has conservatively categorized the pressure boundary functions of systems under its exemption categorization process. As evidence of the robustness of the exemption categorization process as applied to pressure boundary, STPNOC notes that, based on the categorizations performed to date, the following systems or portions of these systems (as well as the applicable components) are categorized as MSS or HSS for functions related to pressure boundary.

- Chemical & Volume Control
- Air starting system for the Standby Diesel Generator
- Lube oil system for the Standby Diesel Generator
- Feedwater
- Main Steam
- Reactor Coolant
- Residual Heat Removal
- Safety Injection
- Steam Generator Blowdown

Based upon its RI-ISI risk ranking process for ASME Class 1 and 2 piping, STPNOC is proposing two different approaches with respect to its exemption request to exclude LSS and NRS components from the scope of the ISI requirements in 10 CFR 50.55a(g), depending upon whether the component is Class 1 or 2 or whether it is Class 3.

STPNOC's Proposed Exemption for ASME Class 1 and 2 Piping and Supports

For the exemption request with respect to ISI for Class 1 and 2 components, STPNOC proposes to use the higher of the RI-ISI risk ranking or the categorization determined by the exemption process for the pressure boundary function. In cases where both are low and/or NRS, the component would be subject to the exemption from 10 CFR 50.55a(g). In cases where either is medium or higher, the component would not be subject to the exemption from 10 CFR 50.55a(g). Instead, the component would be subject to the RI-ISI program, based upon its risk ranking under that program.

STPNOC notes that its RI-ISI risk ranking process only applies to piping. For purpose of the exemption from 10 CFR 50.55a(g) with respect to pipe supports, STPNOC will assign pipe supports the same ranking as the associated section of piping as described above. Other Class 1 and 2 components (e.g., vessels, heat exchangers, tanks, pumps, and valves) are not subject to STPNOC's request for exemption from 10 CFR 50.55a(g).

The following matrix summarizes STP's proposal with respect to ISI for ASME Class 1 and 2 piping and its supports:

		Exemption Category	
		HSS/MSS	**LSS/NRS**
RI-ISI Risk Rank	**High or Medium**	The component is not subject to the exemption. Piping is subject to RI-ISI, with a risk rank of high or medium, as applicable. Supports are subject to ISI in accordance with the STPNOC ISI program.	The component is not subject to the exemption. Piping is subject to RI-ISI, with a risk rank of high or medium, as applicable. Supports are subject to ISI in accordance with the STPNOC ISI program.
	Low	The component is not subject to the exemption. Piping is subject to RI-ISI, with a risk rank of low. Supports are subject to ISI in accordance with the STPNOC ISI program.	Piping and supports are subject to the exemption, and are outside the scope of ISI.

Since NRC has already determined that the RI-ISI process is sufficiently robust for risk ranking of passive functions (i.e., structural integrity and pressure boundary), and since STPNOC is not proposing (for purposes of the exemption) to categorize piping lower than its RI-ISI risk ranking, there is a sufficient technical justification for STPNOC's proposal to exclude LSS/NRS Class 1 and 2 piping and its supports from the scope of the ISI requirements in 10 CFR 50.55a(g) to the extent that they have been risk ranked as low under the RI-ISI program.

STPNOC has performed a comparison of the RI-ISI risk ranking (based on EPRI methodology for RI-ISI) of Class 1 and Class 2 piping against the categorization for the pressure boundary function as determined by the exemption categorization process for the associated systems. Results show that, with one exception, piping that is LSS or NRS under the exemption categorization process is also risk ranked as low under the RI-ISI methodology. The one exception is on the Auxiliary Feedwater (AFW) system, where portions of the piping are assigned an RI-ISI risk of medium compared to LSS as determined by the exemption categorization process. As indicated by the above matrix, those portions of the AFW system will not be subject to the exemption.

STPNOC also notes that, to date, it has not categorized the piping and its supports under the categorization process described in the exemption request. Until such time as the NRC approves the exemption request and piping is categorized under both processes, the piping and its supports will remain under the scope of Section XI or RI-ISI, as applicable - - i.e., it will not be removed from the scope of ISI under 10 CFR 50.55a(g).

Thus, from a risk-informed perspective, STPNOC concludes that its exemption categorization process and RI-ISI risk ranking process adequately evaluate the safety significance of the passive functions, such as pressure boundary and structural integrity, of Class 1 and 2 piping and its supports.

STPNOC's Proposed Exemption for ASME Class 3 Components

As discussed above, STPNOC is not planning to request relief to extend its RI-ISI risk ranking process to ASME Class 3 components. Therefore, STPNOC cannot use the above matrix for Class 3 components. Instead, STPNOC is proposing that Class 3 components and their supports be excluded from the scope of the ISI requirements in 10 CFR 50.55a(g) if their pressure boundary function is categorized as LSS or NRS under the exemption categorization process. As discussed below, STPNOC's proposed exemption categorization process is sufficiently robust to support its application to passive functions for Class 3 components, given their lower safety significance.

STPNOC's categorization process evaluates the risk significance of individual SSCs using PRA insights and deterministic insights. All SSCs undergo the deterministic review process, and those SSCs modeled in the PRA also undergo the PRA categorization process. In the deterministic categorization process, the pressure boundary function is explicitly categorized. For each fluid system that has been reviewed under this process, the system function of maintaining pressure boundary has been evaluated for risk significance by the GQA Working Group using the process described in the exemption request. This process includes the assessment of the five critical questions. SSCs whose failure could compromise the pressure boundary function were then assigned the same category as the function.

As detailed in the description of the deterministic process, the critical questions are answered based on the impact and probability of the failure. Operational and historical data has shown that passive failures occur much less frequently than active failures. For example, EPRI report TR-110381, Risk-Based Snubber Inspection and Testing Guidelines, which was referenced in our response to RAI 19, states that dynamic testing has demonstrated that, structurally, ASME-designed valves and piping are inherently robust. This is consistent with historical data and indicates that catastrophic passive failures of ASME systems are highly unlikely. Pressure boundary failures are typically evidenced by small leaks that can quickly be detected, mitigated, and corrected. In addition, EPRI report TR-111880, Piping System Failure Rates and Rupture Frequencies for Use in Risk-Informed In-service Inspection Applications, provides experience data and conclusions that support STPNOC's evaluation of the risk significance of pressure boundary. The low probability of rupture of piping components was taken into account during the categorization of the pressure boundary function and its supporting components.

Class 3 components in systems or portions of systems where the pressure boundary function was categorized as LSS are typically not classified as high energy. For such components, credible leakage would not have a significant impact on system or plant operation. Typically, there are means for make-up to the system. Additionally, reliability in this area has been good. Component pressure boundary failures, when they occur, exhibit themselves primarily as leaks rather than ruptures. These leaks would quickly become evident during routine operator rounds, system engineer walkdowns, or other visual or system performance indication. The probability of component rupture in an ASME Class 3 system is very unlikely, and the probability of such a rupture occurring at the same time as a safety system being demanded to support accident or transient mitigation is even more remote and is not credible. Therefore, there is a sound basis for categorizing the pressure boundary function of most Class 3 components as LSS or NRS.

The exemption categorization process does not explicitly assign a category to the structural integrity function of components. However, consideration of the probability and impact of structural integrity failure is inherent in the component performance and reliability data (both STP and industry) used during the categorization process. Passive failures of selected pressure boundary components are also included in the PRA as initiating events, based on their impact on the plant and the frequency of occurrence. Additionally, spatial interaction analyses for internal flooding scenarios are also included. The PRA results show that internal floods are not dominant scenarios to either core damage or large early release. Furthermore, other types of spatial interactions are not important for Class 3 components. In addition, most Class 3 systems are not high energy systems. For those systems that are not high energy, pipe whip and jet impingement are not a significant concern, and a postulated rupture of the system would not result in a harsh environment. Furthermore, the probability of a rupture of a Class 3 system at the same time as a safety system being demanded to support accident or transient mitigation is very remote and not credible. Finally, Section 3.6.1.3.2 of the Updated Final Safety Analysis Report for STP identifies various design features that are in place to protect other systems from the effects of pipe failures, including separation of piping from other safety systems, use of barriers and shields, and use of piping restraints. Based upon all of the above, it is apparent that, from a risk-informed perspective, the importance of Class 3 components is limited to the pressure boundary function, not structural integrity. Therefore, there is no technical basis for requiring the exemption categorization process to explicitly account for structural integrity failures of passive components.

Finally, as noted above, with one exception involving a portion of the AFW system, the category assigned to the pressure boundary function under the exemption categorization process is the same as or higher than the category assigned to the associated piping under the NRC-approved RI-ISI risk ranking process for STP. This is a further indication of the robustness of the exemption categorization process, as applied to both pressure boundary and structural integrity functions.

Thus, from a risk-informed perspective, STPNOC concludes that its exemption categorization process adequately evaluates the safety significance of the passive functions, such as pressure boundary and structural integrity, of Class 3 components.

Attachment 2

Open item 4.1: STPNOC needs to describe in the FSAR the process attributes for determining the appropriate treatment to be applied to risk-significant functions of both safety-related and non-safety related HSS and MSS SSCs not currently covered by programs established in response to the NRC regulations.

Response:

STPNOC has revised its proposed UFSAR Section 13.7, which is attached. In particular, proposed UFSAR Sections 13.7.3.1 and 13.7.3.2 have been revised to describe the process for determining the appropriate treatment to be applied to the risk-significant functions of safety-related and non-safety-related HSS and MSS components not currently covered by programs established in response to NRC regulations (i.e., risk-significant beyond-design-basis functions). This revision reflects the proposed resolutions discussed during the meetings on December 6 and 8, 2000.

As part of the discussion of this Open Item in the draft safety evaluation, NRC commented that there is a need to monitor the performance of risk-significant functions of HSS and MSS SSCs at the component level. The response to Open Item 13.1 addresses those comments.

Additionally, as part of the discussion of this Open Item in the draft safety evaluation, NRC commented that STP needs to evaluate facility changes to risk-significant beyond-design-basis functions of HSS and MSS components to ensure that those functions will continue to be satisfied and that the credit assumed in the categorization process remains valid. Design changes are not within the scope of the exemption request. However, STP notes that design changes to risk-significant beyond-design-basis functions of HSS and MSS components will continue to be controlled in accordance with its Appendix B design control program. Additionally, as discussed in proposed UFSAR Section 13.7.5.1, STP has a PRA configuration control program to ensure that changes in plant design are reflected in the PRA.

Attachment 3

Open Item 4.2: STPNOC must revise the proposed FSAR section that provides the description of attributes of its proposed treatment processes that form the basis for its exemption requests to incorporate the additional attributes needed as identified in this draft safety evaluation. See Sections 4.3.3.2, 4.3.3.3, 4.3.3.4, 4.3.3.5, 4.3.3.7, and 8.4 of this draft safety evaluation. The level of detail in the revisions to the FSAR should be consistent with the level of detail in the July 19, 2000, draft review guidelines for each of the alternative treatment processes.

Response:

STPNOC has revised its proposed UFSAR Section 13.7, which is attached. In particular, proposed UFSAR Section 13.7.3.3 has been revised to provide a description of the attributes of STPNOC's proposed treatment for safety-related LSS and NRS components. The revision addresses the comments in Sections 4.3.3.2, 4.3.3.3, 4.3.3.4, 4.3.3.5, 4.3.3.7, and 8.4 of NRC's draft safety evaluation, and reflects the proposed resolutions discussed during the meetings on December 6 and 8, 2000. The level of detail in the revision is consistent with the level of detail in NRC's July 19, 2000 draft review guidelines.

Attachment 4

STPEGS UFSAR 13.7

13.7 RISK-INFORMED SPECIAL TREATMENT REQUIREMENTS

13.7.1 Introduction

NRC regulations in 10 CFR Parts 21, 50, and 100 contain special treatment requirements that impose controls to ensure the quality of components that are safety-related, important to safety, or otherwise come within the scope of the regulations. These special treatment requirements go beyond normal commercial and industrial practices, and include quality assurance (QA) requirements, qualification requirements, inspection and testing requirements, and Maintenance Rule requirements. STP has been granted an exemption from the special treatment requirements. Table 13.7-1 identifies the regulations from which an exemption was granted and the scope of the exemption. This exemption only pertains to special treatment requirements; it does not change the design and functional requirements for components.

STP has a risk-informed process for categorizing the safety/risk significance of components. This process is described in Section 13.7.2. Components with no or low safety significance have been exempted from the scope of most of the NRC regulations that impose special treatment requirements, and instead are subject to normal industrial and commercial practices. Additionally, components with medium or high safety significance are evaluated for enhanced treatment. Components retain their original regulatory requirements unless they have been recategorized using the process described below. The treatment for the various categories of components is described in Section 13.7.3. As part of this process, STP also performs continuing evaluations and assessments, which are described in Section 13.7.4. Finally, STP applies quality assurance to this process, and controls changes to the process, as described in Section 13.7.5.

13.7.2 Component Categorization Process

13.7.2.1 Overview of Categorization Process. The process utilized by STP in categorizing components consists of the following major tasks:

1. Identification of functions performed by the subject plant system.
2. Determination of the risk significance of each system function.
3. Identification of the system function(s) supported by that component.
4. Determination of a risk categorization of the component based on probabilistic risk assessment (PRA) insights (where the component is modeled)
5. Development of a risk categorization of the component based on deterministic insights.
6. Designation of the overall categorization of the component, based upon the higher of the PRA categorization and the deterministic categorization.

7. **Identification of critical attributes for components determined to be safety/risk significant.**

The processes for determining the risk categorization and deterministic categorization of a component are described in more detail in Sections 13.7.2.3 and 13.7.2.4.

Based upon these processes, a component is placed into one of four categories: 1) high safety/risk significant (HSS), 2) medium safety/risk significant (MSS), 3) low safety/risk significant (LSS), and 4) non-risk significant (NRS). This categorization process does not, in and of itself, affect the other classifications of the component (e.g., safety, seismic, ASME classification).

The process is implemented by a Working Group comprised of individuals experienced in various facets of nuclear plant operation and reviewed by an Expert Panel. This integrated decision process is described in more detail in Section 13.7.2.2.

13.7.2.2 <u>Comprehensive Risk Management Process</u>. The integrated decision-making process used by STP is controlled by procedure. The integrated decision-making process incorporates the use of an Expert Panel and Working Groups. The Expert Panel is comprised of qualified senior level individuals and is responsible for oversight of the program and for reviewing the activities and recommendations of the Working Group. The Working Group is comprised of experienced individuals who apply risk insights and experience to categorize components in accordance with the process described in this Section and make recommendations to the Expert Panel.

The Expert Panel and Working Group have expertise in the areas of risk assessment, quality assurance, licensing, engineering, and operations and maintenance. The combined membership of the Expert Panel and Working Group includes at least three individuals with a minimum of five years experience at STP or similar nuclear plants, and at least one individual who has worked on the modeling and updating of the PRA for STP or similar plants for a minimum of three years.

Procedures control the composition of and processes used by the Expert Panel and Working Group. Procedures also identify training requirements for members of the Expert Panel and Working Group, including training on probabilistic risk assessment, risk ranking, and the graded quality assurance process. Finally, the procedures specify the requirements for a quorum of the Expert Panel and Working Group, meeting frequencies, the decision-making process for determining the categorization of components, the process for resolving differing opinions among the Expert Panel and Working Group, and periodic reviews of the appropriateness of the programmatic control and oversight of categorized components.

13.7.2.3 <u>PRA Risk Categorization Process</u>. A component's risk categorization is initially based upon its impact on the results of the PRA.

STP's PRA calculates both a core damage frequency (CDF) and a large early release frequency (LERF). The PRA models internal initiating events at full power, and also accounts for the risk associated with external events.

The PRA configuration control program incorporates a feedback process to update the PRA Model. The updates are segregated into two categories:

- **The plant operating update incorporates plant design changes and procedure changes that affect PRA-modeled components, initiating event frequency updates, and changes in SSC unavailability that affect the PRA model. These changes will be incorporated into the model on a period not to exceed 36 months.**

- **The comprehensive data update incorporates changes to plant-specific failure rate distributions and human reliability, and any other database distribution updates (examples would include equipment failure rates, recovery actions, and operator actions). This second category will be updated on a period not to exceed 60 months.**

The PRA model may be updated on a more frequent basis if an update would result in a significant increase in the CDF.

Only components that are modeled in the PRA are given an initial risk categorization. The PRA risk categorization of a component is based upon its Fussell-Vessely (FV) importance, which is the fraction of the CDF and LERF to which failure of the component contributes, and its risk achievement worth (RAW), which is the factor by which the CDF and LERF would increase if it were assumed that the component is guaranteed to fail. Specifically, PRA risk categorization is based upon the following:

PRA Ranking	Criteria
High	RAW ≥ 100.0 or FV ≥ 0.01 or FV ≥ 0.005 and RAW ≥ 2.0
Medium (Further Evaluation is Required)	FV < 0.005 and 100.0 > RAW ≥ 10.0
Medium	FV ≥ 0.005 and RAW < 2.0 or FV < 0.005 and 10.0 > RAW ≥ 2.0
Low	FV < 0.005 and RAW < 2.0

13.7.2.4 Deterministic Categorization Process. Components are subject to a deterministic categorization process, regardless of whether they are also subject to the risk categorization process using PRA insights. This deterministic categorization process can result in an increase, but not a decrease (from the PRA risk), in a component's categorization.

A component's deterministic categorization is directly attributable to the importance of the system function supported by the component. In cases, where a component supports more than one system function, the component is classified based on the highest safety classification of the function supported. In categorizing the functions of a system, the Working Group considers five critical questions regarding the function, each of which is given a different weight. These questions and their weight are as follows:

QUESTION	WEIGHT
Is the function used to mitigate accidents or transients?	5
Is the function specifically called out in the emergency operating procedures (EOPs) or Emergency Response Procedures (ERPs)?	5
Does the loss of the function directly fail another risk-significant system?	4
Is the loss of the function safety significant for shutdown or mode changes?	3
Does the loss of the function, in and of itself, directly cause an initiating event?	3

Based on the impact on safety if the function is unavailable and the frequency of loss of the function, each of the five questions is given a numerical answer ranging from 0 to 5. This grading scale is as follows:

"0" - Negative response

"1" - Positive response having an insignificant impact and/or occurring very rarely

"2" - Positive response having a minor impact and/or occurring infrequently

"3" - Positive response having a low impact and/or occurring occasionally

"4" - Positive response having a medium impact and/or occurring regularly

"5" - Positive response having a high impact and/or occurring frequently

The definitions for the terms used in this grading scale are as follows:

<u>Frequency Definitions</u> –

- **Occurring Frequently – continuously or always demanded**
- **Occurring Regularly – demanded > 5 times per year**
- **Occurring Occasionally – demanded 1-2 times per cycle**
- **Occurring Infrequently – demanded < once per cycle**
- **Occurring Very Rarely – demanded once per lifetime**

<u>Impact Definitions</u> –

- **High Impact – a system function is lost which likely could result in core damage and/or may have a negative impact on the health and safety of the public**

- **Medium Impact – a system function is lost which may, but is not likely to, result in core damage and/or is unlikely to have a negative impact on the health and safety of the public**

- **Low Impact – a system function is significantly degraded, but no core damage and/or negative impact on the health and safety of the public is expected**

- **Minor Impact – a system function has been moderately degraded, but no core damage or negative impact on the health and safety of the public**

- **Insignificant Impact – a system function has been challenged, but no core damage or negative impact on the health and safety of the public**

Although some of these definitions are quantitative, both of these sets of definitions are applied based on the collective judgment and experience of the Working Group.

The numerical values, after weighting, are summed; the maximum possible value is 100. Based on the sum, functions are categorized as follows:

SCORE RANGE	CATEGORY
0 – 20	NRS
21 – 40	LSS
41 – 70	MSS
71 – 100	HSS

A function with a low categorization due to a low sum can receive a higher risk classification if any one of their five questions received a high numerical answer. Specifically, a weighted score of 25 on any one question results in an HSS categorization; a weighted score of 15-20 on any one question results in a minimum categorization of MSS; and a weighted score of 9-12 on any one question results in a minimum categorization of LSS. This is done to ensure that a component with a significant risk in one area does not have that risk masked because of its low risk in other areas.

In general, a component is given the same categorization as the system function that the component supports. However, a component may be ranked lower than the associated system function.

13.7.2.5 Defense in Depth and Safety Margins. For the following reasons, the exemption and the categorization process maintain defense in depth and sufficient safety margins:

- **Functional requirements and the design configuration of systems are retained.**
- **No existing plant barriers are removed or altered.**
- **Design provisions for redundancy, diversity, and independence are maintained.**
- **The plant's response to transients or other initiators is not affected.**
- **Preventive or mitigative capability of components is preserved.**
- **There is no change in any of the safety analyses in the UFSAR.**
- **Existing safety-related LSS and NRS components will not be replaced, absent good cause (e.g., obsolescence or failure). Since the existing safety-related LSS and NRS components were designed, procured, manufactured, and installed in accordance with the existing special treatment requirements, these components have inherent design margins to perform their intended functions that will not be adversely affected by this exemption.**
- **Normal commercial and industrial practices provide an appropriate and acceptable level of assurance that safety-related LSS and NRS components will be able to perform their intended functions.**
- **The corrective action program is applied to safety-related LSS and NRS components. This program provides reasonable assurance that deficiencies involving safety-related LSS and NRS components will be identified, corrected, and necessary action taken to ensure acceptable performance levels are maintained.**

13.7.3 Treatment for Component Categories

13.7.3.1 Description of Treatment for Component Categories. The following treatment is provided for the various component categories:

- Safety-Related HSS and MSS Components – These components continue to receive the treatment required by NRC regulations and STP's associated implementing programs. Some safety-related components may be called upon to perform functions that are beyond the design basis or perform safety-related functions under conditions that are beyond the design basis. STP's PRA does not take credit for such functions unless there is basis for confidence that the component will be able to perform the functions (e.g., the functions are subject to special treatment; demonstrated ability of the component to perform the functions under the specified conditions). Additionally, to the extent that the PRA does credit such functions, the PRA assumes a reduced reliability for the function commensurate with the severity of the beyond design basis conditions in question and the special treatment provided to the function. Therefore, STP does not need to evaluate whether enhanced treatment should be provided to safety-related HSS and MSS components to account for such functions. However, if STP should decide to take credit for such functions beyond that described above, STP would use the process described in Section 13.7.3.2 to evaluate the risk-significant functions performed by these components that are not being treated under STP's current programs, and provide enhanced treatment for such functions.

- Non-Safety-Related HSS and MSS Components – These components will continue to receive any existing special treatment required by NRC regulations and STP's implementing programs. Additionally, the risk-significant functions of these components will receive consideration for enhanced treatment. This consideration is described in Section 13.7.3.2.

- Safety-Related LSS and NRS Components – These components receive STP's normal commercial and industrial practices. These practices are described in Section 13.7.3.3.

- Non-Safety-Related LSS and NRS Components – The treatment of these components is not subject to regulatory control.

- Uncategorized Components – Until a component is categorized, it continues to receive the treatment required by NRC regulations and STP's associated implementing programs, as applicable.

13.7.3.2 Enhanced Treatment for HSS and MSS Components. Non-safety-related HSS and MSS components may perform risk-significant functions that are not addressed by STP's current treatment programs.

When a non-safety-related component is categorized as HSS or MSS, STP documents the condition under the corrective action program and determines whether enhanced treatment is warranted to enhance the reliability and availability of the function. In particular, STP evaluates the treatment applied to the component to ensure that the existing controls are sufficient to maintain the reliability and availability of the component in a manner that is consistent with its categorization. This process evaluates the reliability of the component, the adequacy of the existing controls, and the need for any changes. If changes are needed, additional controls are applied to the component. In addition, the component is placed under the Maintenance Rule monitoring program, if not already scoped in the program (i.e., failures of the component are evaluated and Maintenance Rule Functional Failures (MRFF) involving the component are counted against the performance criteria at the plant/system/train level, as applicable). Additionally, as provided in the approved GQA program, non-safety-related HSS and MSS components are subject to the TARGETED QA program. These controls will be specifically 'targeted' to the critical attributes that resulted in the component being categorized as HSS or MSS. Components under these controls will remain non-safety-related and will be procured commercial, but the special treatments will be appropriately applied to give additional assurance that the component will be able to perform its HSS/MSS function when demanded.

As discussed in Section 13.7.3.1, STP's PRA does not take credit for the beyond-design basis functions of safety-related components, unless there is a basis for confidence that the component will be able to perform the functions. However, if STP should decide to take credit for a risk-significant function in a situation in which existing special treatment does not provide the applicable level of confidence, STP would use the process described above to evaluate enhanced treatment for the function.

These identified processes provide reasonable assurance that HSS and MSS components will be able to perform their safety significant functions.

13.7.3.3 <u>Normal Commercial and Industrial Practices for Safety-Related LSS and NRS Components</u>

A description of STP's commercial practices is provided below.

13.7.3.3.1 <u>Design Control Process</u>. The Station's Design Control Program is used for safety-related SSCs, including safety-related LSS and NRS SSCs). The Design Control Program complies with 10 CFR Part 50, Appendix B and is described in the Operations Quality Assurance Plan (OQAP).

13.7.3.3.2 <u>Procurement Process</u>. Technical requirements (including applicable design basis environmental and seismic conditions) are specified for items to be procured, which include the original design inputs and assumptions for the item. One or more of the following methods are used to determine that the procured item can perform its safety-

related function under design basis conditions, including applicable design basis environmental and seismic conditions:

- **Vendor Documentation - The performance characteristics for the item, as specified in vendor documentation (e.g., catalog information, certificate of conformance), satisfy STP's technical requirements.**

- **Equivalency Evaluation - An equivalency evaluation determines that the procured item is equivalent to the item being replaced (e.g., a like-for-like replacement).**

- **Engineering Evaluation - An engineering evaluation compares the differences between the procured item and original item and determines that the procured item can perform its safety-related function under design basis conditions.**

- **Engineering Analysis - In cases involving design changes or substantial differences between the procured item and replacement item, an engineering analysis may be performed to determine that the procured item can perform its safety-related function under design basis conditions. The engineering analysis may be based upon a computer calculation, evaluations by multiple disciplines, test data, or operating experience related to the procured item over its expected life.**

- **Testing - If none of the above methods are sufficient, commercial testing would be performed on the component. Margins, documentation, and additional assurance specified in NRC regulations would not be required in these tests, since the components are LSS/NRS and do not warrant this additional assurance.**

Documentation of the implementation of these methods is maintained. Additionally, documentation is maintained to identify the preventive maintenance needed to preserve the capability of the procured item to perform its safety-related function under applicable design basis environmental and seismic conditions for its expected life.

A Purchase Order is issued to the supplier, which specifies the item to be procured either by catalog identification or procurement specifications, as applicable.

STP uses the following commercial national consensus standards in the procurement process, as necessary to provide confidence that components can perform their safety-related function:

- **Standards required by the State of Texas to be used in the process.**

- **Existing standards, in cases where STP has determined at the time of the granting of the exemption that it is appropriate to apply those standards in the process.**

- **Future standards at STP's discretion, either as an additional standard or in lieu of a standard in use at the time of the granting of the exemption.**

STP does not need to itemize the standards in use at STP or to perform an evaluation of all national consensus standards.

The procurement program provides for the identification and implementation of special handling and storage requirements (if required) to ensure that the item is not damaged or degraded during shipment to the site or during storage on site. These handling and storage requirements consider available recommendations from the vendor. STP may use an alternative to these recommendations if there is a basis for doing so. The basis does not need to be documented.

At the time of receipt, the received item is inspected to ensure that the item was not damaged in the process of shipping, and that the item received is the item ordered.

13.7.3.3.3 Installation Process. STP uses the following commercial national consensus standards in the installation process, as necessary to provide confidence that components can perform their safety-related function:

- **Standards required by the State of Texas to be used in the process.**
- **Existing standards, in cases where STP has determined at the time of the granting of the exemption that it is appropriate to apply those standards in the process.**
- **Future standards at STP's discretion, either as an additional standard or in lieu of a standard in use at the time of the granting of the exemption.**

STP does not need to itemize the standards in use at STP or to perform an evaluation of all national consensus standards.

Appropriate testing is performed if the installation could affect an SSC's safety-related function. The test verifies that the SSC is operating within expected parameters and is functional. The testing may necessitate that the SSC be placed in service to validate the acceptance of its performance. Testing is not necessarily performed under design basis conditions.

13.7.3.3.4 Maintenance Process. Preventive maintenance tasks are developed for active structures, systems, or components factoring in vendor recommendations. STP may use an alternative to these recommendations if there is a basis for doing so. The basis does not need to be documented.

When an SSC deficiency is identified, it is documented and tracked through the Corrective Action Program. The deficiency is evaluated to determine the appropriate corrective maintenance to be performed.

Post maintenance testing, as required, is performed to provide an appropriate level of assurance that the SSC is performing within expected parameters prior to being returned to service.

STP uses the following commercial national consensus standards in the maintenance process, as necessary to provide confidence that components can perform their safety-related function:

- **Standards required by the State of Texas to be used in the process.**
- **Existing standards, in cases where STP has determined at the time of the granting of the exemption that it is appropriate to apply those standards in the process.**
- **Future standards at STP's discretion, either as an additional standard or in lieu of a standard in use at the time of the granting of the exemption.**

STP does not need to itemize the standards in use at STP or to perform an evaluation of all national consensus standards.

13.7.3.3.5 Inspection,Test, and Surveillance Process. The Station's inspection and test process is primarily addressed and implemented through the Maintenance process. As stated above, the Maintenance process addresses inspections and tests through corrective, preventive, and predictive maintenance activities. These activities factor in vendor recommendations into the selected approach. STP may use an alternative to these recommendations if there is a basis for doing so. The basis does not need to be documented.

ASME pumps and valves are subject to routine operation or periodic tests to provide confidence that they can perform their safety-related function under design basis conditions. This includes one or more of the following:

- **Components Subject to Routine Operation - Running of the pump or actuation of the valve during normal operation, system alignment changes, or mode changes.**
- **Components Not Subject to Routine Operation - Testing of the pump or valve using: 1) the inservice test (IST) approach specified in 10 CFR 50.55a(f), but at a reduced frequency and without the other special treatment required by that section; or 2) an approach that is different than the IST approach specified in 10 CFR 50.55a(f) but still sufficient to provide confidence that the component has not failed.**

Such operation and testing do not need to be conducted under design basis conditions.

STP uses the following commercial national consensus standards in the inspection, test, and surveillance process, as necessary to provide confidence that components can perform their safety-related functions:

- **Standards required by the State of Texas to be used in the process.**
- **Existing standards, in cases where STP has determined at the time of the granting of the exemption that it is appropriate to apply those standards in the process.**

- **Future standards at STP's discretion, either as an additional standard or in lieu of a standard in use at the time of the granting of the exemption.**

STP does not need to itemize the standards in use at STP or to perform an evaluation of all national consensus standards.

13.7.3.3.6 Corrective Action Program. The Station's Corrective Action Program is used for both safety-related (LSS and NRS as well as HSS and MSS SSCs) and non-safety-related applications. The Corrective Action Program complies with 10 CFR Part 50 Appendix B, and is described in the OQAP.

13.7.3.3.7 Management and Oversight Process. The Station's management and oversight process is accomplished through approved procedures and guidelines. This process includes independent oversight, line self-assessments, and Maintenance Rule implementation (system or train level for LSS and NRS). In addition, the Graded Quality Assurance Working Group periodically assesses SSC performance.

Procedures provide for the qualification, training, and certification of personnel, commensurate with the functions they perform. Experienced personnel may be exempted from prerequisite training. STP considers vendor recommendations in the training, qualification, and certification of personnel. STP may use an alternative to these recommendations if there is a basis for doing so. The basis does not need to be documented. Additionally, STP uses the following commercial national consensus standards for qualification, training, and certification of personnel, as necessary to provide confidence that components can perform their safety-related function:

- **Standards required by the State of Texas to be used in the process.**

- **Existing standards, in cases where STP has determined at the time of the granting of the exemption that it is appropriate to apply those standards in the process.**

- **Future standards at STP's discretion, either as an additional standard or in lieu of a standard in use at the time of the granting of the exemption.**

STP does not need to itemize the standards in use at STP or to perform an evaluation of all national consensus standards.

Documentation, reviews, and record retention requirements for completed work activities are governed by Station procedures.

Procedures identify the types of inspection, test, and surveillance equipment requiring control and calibration, and the interval of calibration. Equipment that is found to be in error or defective is removed from service or properly tagged to indicate the error or defect, and a determination is made of the functionality of the HSS/MSS SSCs that were checked using that equipment.

13.7.3.3. 8 Configuration Control Process. The Station's configuration control process is controlled through approved procedures and policies. The design control process ensures that the configuration of the Station is properly reflected in design documents and drawings.

13.7.4 Continuing Evaluations and Assessments

13.7.4.1 Performance Monitoring. STP has performance monitoring processes for the changes in the special treatment. This monitoring includes the following:

- **Maintenance Rule Program – Specific performance criteria are identified at the plant, system, or train level. Regardless of their risk categorization, components that affect MSS or HSS functions will be monitored and assessed in accordance with plant, system and/or train performance criteria.**

- **Performance Reporting & Identification Database – This database collects both positive and negative indicators from the performance of plant activities, such as corrective maintenance, installation of modifications, and conduct of testing. The Quality organization provides oversight of this database.**

- **Corrective Action Program - Condition reports document degraded equipment performance or conditions, including conditions identified as a result of operator rounds, system engineer walk-downs, and corrective maintenance activities.**

13.7.4.2 Feedback and Corrective Action. STP has feedback and corrective action processes to ensure that equipment performance changes are evaluated for impact on the component risk categorization, the application of special treatment, and other corrective actions. At least once per cycle, performance data is compiled and presented to the Working Group for review, which is performed for each risk-categorized system. Performance and reliability data are generally obtained from sources such as the Maintenance Rule Program and Operating Experience Review.

This process provides an appropriate level of assurance that any significant negative performance changes that are attributed to the relaxation of special treatment controls are addressed in a timely manner. Responsive actions may include the reinstatement of applicable controls up to and including the re-categorization of the component's risk significance, as appropriate.

13.7.4.3 Process for Assessing Aggregate Changes in Plant Risk. The Expert Panel is responsible for assessing and approving the aggregate effect on plant risk for risk-informed applications.

The process used to access the aggregate change in plant risk associated with changes in special treatment for components is based on periodic updates to the station's PRA and the associated PRA risk ranking sensitivity studies.

13.7.5 Quality Assurance and Change Control for the Risk-Informed Process

13.7.5.1 Quality Assurance for the PRA and Categorization Process.

STP has a PRA configuration control program, which is structured to ensure that changes in plant design and equipment performance are reflected in the PRA as appropriate. The PRA configuration control process is controlled by procedures and guidelines that ensure proper control of changes to the models.

13.7.5.2 Regulatory Process for Controlling Changes. Changes affecting Section 13.7 will be controlled in accordance with the following provisions:

- **Changes in the Component Categorization Process as described in Section 13.7.2 may be made without prior NRC approval, unless the change would decrease the effectiveness of the process in identifying HSS and MSS components.**
- **Changes in the Treatment of Component Categories as described in Section 13.7.3 may be made without prior NRC approval, unless the change would result in more than a minimal reduction in the assurance of component functionality.**
- **Changes in the Continuing Evaluations and Assessments as described in Section 13.7.4 may be made without prior NRC approval, unless the change would result in more than a minimal decrease in effectiveness of the evaluations and assessments.**

STP shall submit a report, as specified in 10 CFR 50.4, of each change made without prior NRC approval pursuant to these provisions. The report shall identify each change and summarize the basis for the conclusion that the change does not involve either a decrease/reduction in effectiveness as described above. The report shall be submitted within 60 days of approval of the change.

TABLE 13.7-1

EXEMPTIONS FROM SPECIAL TREATMENT REQUIREMENTS

Regulation	Scope of Exemption
10 CFR 21.3 – An exemption to exclude safety-related LSS and NRS components from the scope of the definition of "basic component."	The procurement, dedication, and reporting requirements in Part 21 are not applied to safety-related LSS and NRS components.
10 CFR 50.34(b)(11) – An exemption to the extent that it incorporates seismic qualification requirements in Part 100.	Refer to request for exemption from Part 100.
10 CFR 50.49(b) – An exemption to exclude LSS and NRS components from the scope of electric equipment important to safety for the purposes of environmental qualification of electrical equipment.	• The qualification documentation and files specified in Section 50.49 are not applicable to LSS and NRS components. • LSS and NRS components are not required to be maintained in a qualified condition under Section 50.49. • LSS and NRS components may be replaced with components that are not qualified under Section 50.49. • LSS and NRS components, as applicable under Section 50.49, are designed to function in the applicable design basis environment. Section 13.7.3.3 identifies the design and procurement controls that are applied to LSS and NRS components to achieve this requirement.
10 CFR 50.55a(f) and (g) – An exemption from the requirements of ASME Section XI, for repair and replacement of ASME Class 2 and 3 safety-related LSS and NRS components, subject to the provisions identified in the scope of exemption.	ASME Class 2 and 3 safety-related LSS and NRS components may be repaired or replaced with components that meet one of the following alternatives: • The repair or replacement item will meet the technical (but not the administrative) requirements of the ASME Construction Code, as incorporated in Section XI. • The repair or replacement item will meet the technical requirements of another nationally-recognized code or standard suitable for the item. • The repair or replacement item will meet the following requirements: *Configuration, pressure temperature rating, and materials*: The repair or replacement item will meet the requirements for configuration, pressure-temperature rating, and stress allowables of the original ASME Construction Code. Additionally, the material will be the same ASME Section II

Regulation	Scope of Exemption
	specification, grade, type, class, alloy, and heat-treated condition, as applicable, as the original item. If an alternative material is selected, the original design report shall be reconciled with the ASME Code, Section III stress allowables for the material. Substitution of an ASTM material specification for an ASME material specification is acceptable as long as the specifications are identical (except for editorial differences). *Castings and Joints*: The ASME Construction Code identifies specific non-destructive examinations (NDE) for castings with quality factors and for joints with efficiency factors. This NDE will be performed, or STPNOC will perform an evaluation that reconciles the elimination of this NDE or the use of an alternative NDE. *Other fabrication, examination and testing requirements*: The repair or replacement item will meet the other fabrication, examination, and testing requirements of a nationally-recognized code or standard. Section 13.7.3.3 identifies the quality, design and procurement controls that are applied to safety-related LSS and NRS components that are repaired or replaced.
10 CFR 50.55a(f) – An exemption from meeting the requirements of ASME Section XI for testing of safety-related LSS and NRS components.	Safety-related LSS and NRS components are not in the scope of component-specific inservice testing requirements. System-level testing requirements continue to be applied. Additionally, Section 13.7.3.3 identifies other controls that are applied to ensure the functionality of safety-related LSS and NRS components.
10 CFR 50.55a(g) – An exemption from meeting the requirements of ASME Section XI for inspection of safety-related LSS and NRS components, subject to the provisions in the Scope of Exemption.	Safety-related LSS and NRS components are not in the scope of component-specific inservice inspection requirements. Section 13.7.3.3 identifies controls that are applied to ensure the functionality of safety-related LSS and NRS components. For ASME Class 1 and 2 components, the exemption from 10 CFR 50.55a(g) is limited to piping and supports, and their categorization is based upon the higher of the categorizations determined by the process discussed in Section 13.7.2 or the risk-informed inservice inspection categorization process for associated piping accepted by NRC for STP under NRC Regulatory Guide 1.178.
10 CFR 50.55a(h) – An exemption to exclude safety-related LSS and NRS components from the scope of components required to meet sections 4.3 and 4.4 of IEEE 279.	Sections 4.3 and 4.4 of IEEE 279 do not apply to safety-related LSS and NRS components. The other requirements listed in IEEE 279, including functional and design requirements, are applicable. Additionally, Section 13.7.3.3 identifies other controls that are applied to ensure

Regulation	Scope of Exemption
	the functionality of safety-related LSS and NRS components.
10 CFR 50.59(a)(1), (a)(2) and (b)(1) (pre-1999 version); 10 CFR 50.59(c)(1), (c)(2), and (d)(1) (2000 version) – An exemption from the requirement to perform a written evaluation of changes in special treatment requirements for LSS and NRS components. Also an exemption from the requirement to seek prior NRC approval for such changes to the extent that they fall within the listed criteria in 50.59.	STP is not required to perform 50.59 evaluations for changes in the special treatment requirements for LSS and NRS components, and is not required to seek prior NRC approval for those changes. The exemption is limited to changes in special treatment requirements for which the exemption has been granted.
10 CFR 50.65(b) – An exemption to exclude LSS and NRS components from the scope of SSCs covered by the Maintenance Rule (except for 10 CFR 50.65(a)(4)).	• STP is required to monitor performance on a plant/system/train level, as applicable. As applicable, STP evaluates failures of LSS and NRS components to determine whether such failures affect MSS or HSS function(s) which then constitute a maintenance rule functional failure at the applicable plant/system/train level.
10 CFR Part 50 Appendix B, Introduction – An exemption to exclude safety-related LSS and NRS components from the scope of safety-related SSCs covered by Appendix B (except for Criterion III pertaining to Design Control and Criteria XV and XVI governing non-conformances and corrective actions).	• Safety-related LSS and NRS components are not required to satisfy the QA requirements in Appendix B, except for design control, control of nonconformances, and corrective action. • Section 13.7.3.3 identifies other controls that are applied to ensure the functionality of safety-related LSS and NRS components.
10CFR Part 50, Appendix J, B.III – An exemption to exclude safety-related LSS and NRS components, subject to the additional limitations listed under Scope of Exemption, from the scope of components requiring local leak rate tests and containment isolation valve leak rate tests.	• Local leak rate tests of LSS containment isolation valves and other safety-related LSS or NRS components are not required. With respect to LSS containment isolation valves, this exemption only applies to valves that satisfy one or more of the following criteria: - The valve is not required to operate (i.e., open) under accident conditions to prevent or mitigate core damage events (e.g., CC-MOV-0057, Component Cooling Water to Reactor Containment Fan Coolers). - The valve is normally closed and in a physically closed, water-filled system (e.g., containment

Regulation	**Scope of Exemption**
	isolation valves in the Demineralized Water system) **- The valve is in a physically closed system whose piping pressure rating exceeds the containment design pressure rating and that is not connected to the reactor coolant pressure boundary (e.g., containment isolation valves in the Main Feedwater system).** **- The valve is in a closed system whose piping pressure rating exceeds the containment design pressure rating, and is connected to the reactor coolant pressure boundary. The process line between the containment isolation valve and the reactor coolant pressure boundary is non-nuclear safety (i.e., the valve itself would have been classified as non-nuclear safety were it not for the fact that it penetrates the containment building). An example is the Safety Injection accumulator nitrogen supply valve.** **- The valve size is 1 inch NPS or less (i.e., by definition the valve failure does not contribute to large early release).** **• Cumulative limits for containment leakage are based upon the tested components, with the assumption that the exempted components contribute zero leakage.** **• Section 13.7.3.3 identifies controls that are applied to ensure the functionality of safety-related LSS and NRS components.**
10 CFR Part 100, Appendix A.VI(a)(1) and (2) – An exemption to exclude safety-related LSS and NRS components from the scope of SSCs covered by these sections, to the extent that these sections require testing and inspection to demonstrate that SSCs are designed to withstand the safe shutdown earthquake and operating basis earthquake.	**• LSS and NRS components are not required to be maintained in a qualified condition under Part 100.** **• LSS and NRS components may be replaced with components that are not qualified under Part 100.** **• LSS and NRS components, as applicable under Part 100, are designed to withstand the effects of design basis seismic events without loss of capability to perform their safety function. Section 13.7.3.3 identifies the design and procurement controls that are applied to LSS and NRS components to achieve this requirement.**

Attachment 5

Open item 11.1: STPNOC needs to provide the NRC with additional information regarding its exemption request from the requirements of 10 CFR 50.55a(h)(2) to the extent that it imposes Section 4.4 qualification requirements of IEEE 279.

Response:

STPNOC's basis for the exemption from the environmental qualification requirements in IEEE 279, as incorporated in 10 CFR 50.55a(h), is the same as its basis for the exemption from the environmental qualification requirements in 10 CFR 50.49. STPNOC's response to Open Item 8.1 describes and provides a technical justification for STPNOC's proposed methods for assuring that LSS and NRS components will be able to perform their functions under applicable design basis environmental conditions. That response also explains why STPNOC needs the exemption from 10 CFR 50.49, and those reasons are equally applicable to the requested exemption from Section 4.4 of IEEE 279 (which requires use of test data to qualify equipment).

The NRC also questioned whether STPNOC's requested exemption from IEEE 279 satisfies the criteria on special circumstances in 10 CFR 50.12(a). STPNOC's requested exemption satisfies three of the criteria on special circumstances in 10 CFR 50.12(a):

- STPNOC's proposed methods described in the response to Open Item 8.1 satisfy the underlying purpose of Section 4.4 of IEEE 279, which is to ensure that components in protection systems can meet their performance requirements on a continuing basis.

- As explained in Section 6 of Attachment 1 of STPNOC's exemption request, the exemption request as a whole would result in benefit to the public health and safety that compensates for any decrease in safety that may result from the grant of the exemption.

- As explained in Section 6 of Attachment 1 of STPNOC's exemption request, the exemption request as a whole involves material circumstances not considered when the applicable regulations were adopted for which it would be in the public interest to grant an exemption.

Attachment 6

Open item 10.1: STPNOC needs to provide a valid basis to justify expansion of the 1 inch Section XI exemption to over 1 inch components.

Open item 10.2: STPNOC needs to provide an adequate engineering basis for mixing the requirements of ASME Code requirements with other code requirements. For example, STPNOC proposes to do leak tests permitted by Section XI in lieu of the construction code hydrostatic tests. Further, STPNOC proposes to use ASME allowable stress limits with commercial design and construction codes, and to eliminate impact testing and nondestructive examination.

Response:

STPNOC is revising its requested exemption with respect to the requirements for repair/replacement of LSS and NRS components under Section XI of the ASME Code. STPNOC's revised request is described and justified below. As this description explains, STPNOC's revised request is not based upon an expansion of the 1-inch NPS and under Section XI exemption to larger components.

1. <u>Description of STPNOC's Proposed Approach</u>

STPNOC's proposed approach is conservative and appropriately tailored for each ASME Class of components. As explained below, more restrictive requirements are imposed on repair and replacement of ASME Class 1 components than on Class 2 and 3 components.

A. <u>ASME Class 1 Components</u>

STPNOC is not requesting an exemption from the repair and replacement requirements in Section XI of the ASME Code with respect to Class 1 components. However, STPNOC does intend to take advantage of the current provisions in Section XI, which provides relief for piping, valves, and fittings with a nominal pipe size of 1-inch or less. Section XI excludes these items from the scope of the repair and replacement requirements of Section XI and, by reference, from the requirements of ASME Section III, as long as the materials and stress levels are consistent with the requirements of the applicable construction code for the replacement item.

Similarly, STPNOC is not requesting an exemption from the fracture toughness requirements in General Design Criteria (GDC) 31 and 51 applicable to the reactor coolant pressure boundary and containment. Therefore, fracture toughness requirements in GDC 31 and 51 will continue to apply to applicable Class 1 components.

B. ASME Class 2 and 3 Components

STPNOC is proposing to use any of the alternatives described below for repair and replacement of ASME Class 2 and 3 components. The term 'item' below includes repairs, replacements, and fabrication and installation welds categorized as LSS or NRS. These alternatives are supported by a draft ASME Code Case, entitled *Alternative Repair/Replacement Requirements for Structures, Systems, and Components Classified in Accordance with Risk-Informed Processes.*

- Alternative 1 - The repair or replacement item will meet the technical (but not the administrative) requirements of the ASME Construction Code, as incorporated in Section XI.

- Alternative 2 – The repair or replacement item will meet the technical requirements of other nationally-recognized Codes, Standards, or Specifications suitable for the item. Examples of other nationally-recognized Codes, Standards, and Specifications are: ASME Section VIII for vessels, B31 series for piping, B16.34 for valves, API 620 for 0 -15 psi storage tanks, and API 650 for atmospheric storage tanks.

- Alternative 3 – The repair or replacement item will meet the following requirements:

  Configuration, pressure-temperature rating, and materials: The repair or replacement item will meet the requirements for configuration, pressure-temperature rating, and stress allowables of the original ASME Construction Code. Additionally, the material will be the same ASME Section II specification, grade, type, class, alloy, and heat-treated condition, as applicable, as the original item. If an alternative material is selected, the original design report shall be reconciled with the ASME Code, Section III stress allowables for the material. Substitution of an ASTM material specification for an ASME material specification is acceptable as long as the specifications are identical (except for editorial differences).

  Castings and Joints: The ASME Construction Code identifies specific non-destructive examinations (NDE) for castings with quality factors and for joints with efficiency factors. This NDE will be performed, or STPNOC will perform an evaluation that reconciles the elimination of this NDE or the use of an alternative NDE.

  Other fabrication, examination and testing requirements: The repair or replacement item will meet the other fabrication, examination, and testing requirements of an appropriate nationally-recognized Code, Standard, or Specification, or the Original Construction Code.

If the affected piping is categorized as LSS or NRS, the welds will also be subject to the above alternatives. Regardless of which alternative is selected, the boundary (e.g., welds) between HSS/MSS ASME and the LSS/NRS portion of the system will continue to comply with ASME Section XI.

As discussed above, STPNOC is not requesting an exemption from the fracture prevention requirements in GDC 31 and 51. Therefore, regardless of which alternative is selected, Class 2 and 3 items, as applicable, will continue to be subject to the fracture prevention requirements of these GDCs.

2. Justification for STPNOC's Approach

A. Mixing of ASME Requirements and Other Code Requirements

NRC has requested the engineering basis for mixing the requirements of ASME Code with other code requirements for a component. In particular, NRC has questioned the propriety of using the higher stress allowables in the ASME Code with the less stringent quality assurance requirements in other nationally-recognized codes and standards

As discussed above, STPNOC is not requesting an exemption with respect to ASME Class 1 components. Therefore, STPNOC will not be mixing code requirements for Class 1 components.

With respect to Class 2 and 3 components, STPNOC will have three available alternatives. As discussed above, the first two alternatives do not entail any mixing of code requirements. The third alternative does involve some mixing of code requirements.

The third alternative is rooted in and closely conforms to the draft Code Case proposed by ASME. As indicated in the draft Code Case, the higher stress allowables in the ASME Code are linked to specific types of NDE (but not to other types of quality assurance requirements). Under Alternative 3 of STPNOC's approach, this linkage between ASME Section III NDE and the higher stress allowables is maintained. Therefore, STPNOC will continue to perform the ASME-required NDE needed to support the higher stress allowables (or will perform an engineering evaluation reconciling any deviation). Consequently, STPNOC believes that this constraint provides a sufficient justification for mixing of code requirements.

B. Fracture Toughness Requirements

The NRC has questioned removal of fracture toughness requirements from the design and procurement requirements.

STPNOC is not seeking an exemption from GDC 31 or GDC 51. Therefore, the fracture toughness requirements in these GDCs will continue to be met regardless of component categorization. In addition, STPNOC is not requesting an exemption with respect to ASME Class 1 components. Therefore, ASME fracture toughness requirements applicable to Class 1 components will continue to be met.

Class 2 and 3 components will meet the fracture toughness requirements in the ASME Code if procured in accordance with Alternative 1. Additionally, if these components are procured in accordance with Alternative 2 or 3, they will meet the fracture toughness requirements in the nationally-recognized Code, Standard, or Specification (to the extent such requirements exist).

Therefore, fracture toughness requirements for design and procurement requirements are properly addressed.

C. Hydrostatic Pressure Tests

NRC has questioned the use of post-installation pressure test provisions from Section XI in lieu of the hydrostatic pressure test provisions for the item.

STPNOC is not proposing to perform post installation pressure tests under ASME Code Section XI in lieu of the hydrostatic tests. Instead, STPNOC will require the vendor to perform the hydrostatic test to the nationally-recognized Code, Standard, or Specification to which the component is constructed. These tests will be in addition to the ASME Section XI tests for the piping and installation welds. If the piping in which the weld falls has been categorized as LSS or NRS, pressure testing is not mandatory.

D. Preservice Examinations

Preservice examinations will be performed as specified by the applicable inservice inspection requirements. For further information on this approach, refer to the response provided for Open Item 3.5.

Attachment 7

Open item 8.1: STPNOC needs to provide additional information on its need for the requested exemption from 10 CFR 50.49(b).

Response:

Summary of STPNOC's Proposed Methods

As summarized in our revision to proposed UFSAR Section 13.7.3.3.2, STPNOC proposes to use one or more of the following methods to determine that the procured LSS/NRS item can perform its safety-related functions under design basis environmental conditions:

- Vendor Documentation - The performance characteristics for the item, as specified in vendor documentation (e.g., catalog information, certificate of conformance), satisfy STP's environmental requirements.

- Equivalency Evaluation - An equivalency evaluation determines that the procured item is equivalent to the item being replaced (e.g., a like-for-like replacement).

- Engineering Evaluation - An engineering evaluation compares the differences between the procured item and original item and determines that the procured item can perform its safety-related function under design basis environmental conditions.

- Engineering Analysis - In cases involving design changes or substantial differences between the procured item and replacement item, an engineering analysis may be performed to determine that the procured item can perform its safety-related function under design basis environmental conditions.

- Testing - If none of the above methods are sufficient, commercial testing would be performed on the component. Margins, documentation, and additional assurance specified in 10 CFR 50.49 would not be required in these tests, since the components are LSS/NRS and do not warrant this additional assurance.

Need for the Exemption

In general, the above methods do not constitute one of the four qualification methods in 10 CFR 50.49(f) (all of which require the use of tests or experience involving the component). For example, the first option listed above (e.g., reliance on vendor catalog information) would not satisfy any of the criteria in 10 CFR 50.49(f). Therefore, from a regulatory perspective, STPNOC needs the exemption to be able to implement the options listed above.

Furthermore, as explained in the attached document, entitled *Risk-Informed Exemption for Seismic and Environmental Qualification*, STPNOC needs the exemption for practical reasons. STPNOC needs the exemption from the environmental and seismic qualification requirements, because in practice the benefits of a risk-informed special treatment program cannot be achieved unless NRC grants an exemption from essentially all of the special treatment requirements imposed by 10 CFR Parts 21, 50, and 100. If NRC were to grant an exemption from some of the special treatment requirements, but not from the environmental and seismic qualification requirements, STPNOC would lose a significant portion of the benefit of its risk-informed program. For example, STPNOC estimates that it would save approximately $1 million per year in procurement costs if safety-related LSS and NRS replacement parts and components could be procured using normal commercial practices (e.g., based upon a vendor's catalog listing). Absent an exemption to exclude safety-related LSS and NRS components from the scope of the environmental and seismic qualification requirements, essentially none of these components could be procured based upon a vendor's catalog listing, and STPNOC's procurement costs would be correspondingly higher.

Details Regarding the Use of STPNOC's Proposed Methods

STPNOC would purchase commercial components that meet the design functional requirements of STP. Components would be selected based upon a comparison of the pressure, temperature, humidity, chemical effects, radiation, aging, and submergence listed in the vendor's catalog with STP's design basis environmental requirements. If the vendor's catalog does not indicate whether the component meets STP's environmental requirements, STPNOC may chose to purchase the component and perform additional evaluations.

In particular, STPNOC would perform the following types of evaluations for the various environmental parameters:

- Temperature & Pressure - Vendor literature can often be used to determine a component's capability to perform in a given temperature and pressure environment. This information is generally available in vendor catalogs and can also be obtained through discussions with the vendor. If the vendor does not have this information, an engineering evaluation/analysis could be performed on the materials comprising the component. For example, literature is available that provides activation energy for materials that can be used in evaluations/analyses of the impacts of temperature on component performance. Alternatively a commercial test of the component could be performed that verifies the temperature and pressure performance.

- Humidity - Vendor published ratings can be used to verify component performance in the required humidity. If this information is not available, STPNOC could compare the configuration of the commercial component with the original component or another qualified component to determine whether they have equivalent design features to prevent intrusion of humidity, or equivalent performance in the presence of humidity. If that type of evaluation/analysis is not feasible due to substantial differences in design, a commercial test could be performed to verify the component's performance in a required humidity.

- Chemical Effects - Vendor literature can be used to verify a component's performance in the required chemical environment. If the vendor's literature does not address this issue, an engineering evaluation/analysis of the materials comprising the component could be performed to determine the component's performance in a chemical environment. This evaluation/analysis might consist of a comparison of the materials of the commercial component with the materials of a qualified component, or might consist of a review of industry studies on the effects of chemicals on the materials in question. Alternatively, a commercial test could be performed to verify the component's performance in a chemical environment.

- Radiation - Vendor literature can sometimes be used to verify a component's capability to perform in a radiation field. However, in general, vendors do not provide such information for commercial components. Therefore, in most cases, an engineering evaluation/analysis would be used to verify a component's ability to perform in a radiation field that matches STPNOC design basis. To prepare such an evaluation/analysis, a complete list of the non-metallic materials would be obtained and reviewed (in general, metallic materials are sufficiently resistant to the levels of radiation applicable to electric components at STP). This list can be obtained in the vendor instruction manual (parts list), vendor technical drawings, or though vendor contact. This listing of materials can then be compared to various available sources such as EPRI reports, EPRI Equipment Qualification Data Bank, NUS Data Base, and Lab Reports (Wyle, Okonite and others) that provide industry data on the behavior of these materials in a radiation field. With this information, conclusions can be draw as to the acceptability of a defined list of materials. In this regard, there is a substantial body of information on the effects of radiation on components. Alternatively, an engineering evaluation/analysis which compares the materials of the commercial component with the materials of a qualified component could be performed.

- Aging - Vendor literature often identifies a lifetime for components. In the absence of this information, STPNOC would perform an engineering evaluation/analysis to determine the lifetime. This evaluation/analysis could be based upon a comparison between the design of the commercial component and the design of a qualified component, or an evaluation of the longevity of the materials in the component versus the design basis environmental conditions. The engineering evaluation/analysis will not factor in pre-aging into this determination.

- Submergence - Vendor literature can be used to determine a component's capacity to perform in a submerged environment. If this information is not available, STPNOC could compare the configuration of the commercial component with the original component or another qualified component to determine whether they have equivalent design features to address submergence (e.g., the existence of no weep holes), or equivalent performance while submerged. If that type of evaluation/analysis is not feasible due to substantial differences in design, a commercial submergence test could be performed to ensure functionality.

- Synergistic Effects - Vendor literature can be used to verify the performance of a component. An engineering evaluation/analysis can also determine if these effects will adversely impact a component's capability to function. Alternatively, a commercial test can be performed that will test these effects.

- Margins - Margins will not be applied to the vendor's published performance factors, nor will margins be applied to engineering evaluations/analyses or commercial tests. LSS/NRS components have no significant impact on risk or safety, and do not warrant additional assurance in the form of margins.

Examples

1. STPNOC needs to replace a safety-related LSS pressure transmitter. A pressure transmitter can be purchased commercially, and a review of the vendor's catalog demonstrates that the component meets STP's design functions and design basis environmental conditions, except that the vendor's catalog does not indicate whether the transmitter is rated for a radiation field exposure. STPNOC chooses to purchase the transmitter, and determines the capability of the transmitter to function in a radiation field. In order to make this determination, STPNOC obtains from the vendor a complete list of the non-metallic materials in the component, and evaluates the materials against various available sources on the effects of radiation on materials, such as EPRI reports, EPRI Equipment Qualification Data Bank, NUS Data Base, and lab reports (Wyle, Okonite and others) that provide industry data on the behavior of these materials in a radiation field. With this information, STPNOC draws conclusions on the acceptability of the materials. If the materials satisfy STP's design basis environmental conditions, STPNOC would install and use the transmitter.

2. STPNOC needs to replace a safety-related NRS pressure transmitter. The same model of transmitter is available as a fully qualified, Appendix B component and as a commercial grade item. STPNOC compares the qualified and commercial models to identify any differences. The comparison determines that the commercial transmitter has a different o-ring and a different conduit seal than the qualified transmitter. These differences would need to be evaluated as acceptable based on research that concluded that the types of materials and seals in the commercial transmitter are capable of sealing in the design basis environment. Alternatively, the o-ring and conduit seal could be replaced with materials and configurations that would withstand a design basis environment. The manufacturer could do this replacement or STPNOC could perform this replacement.

3. Vendor information does not indicate whether a commercial transmitter meets the design basis environmental conditions and an engineering evaluation can not conclude that the component will function in the design basis environment. In this case, the commercial transmitter would need to be commercially tested to STP's functional requirements and design basis environmental conditions. This testing would include design basis temperature, pressure, humidity, chemical effects, radiation, aging, submergence and synergistic effects as applicable to the design requirements for the component being tested. Margins, documentation, and additional assurance specified in 10 CFR 50.49 would not be required, since the subject components are LSS/NRS and do not warrant this level of assurance.

Assurance of Functionality

NRC has also questioned whether the methods listed above are sufficient to provide assurance of the functionality of components under design basis environmental conditions. As explained in the attached document, entitled *Risk-Informed Exemption for Seismic and Environmental Qualification*, STPNOC will be 1) using an Appendix B design control program to assure that the design of the components is sufficient to accomplish their functions under design environmental conditions; 2) continuing to apply the STP Appendix B corrective action program to assure that identified deficiencies in the components are corrected; and 3) providing the above methods to ensure that LSS and NRS components can perform their functions in applicable environmental conditions. In total, these controls provide a level of assurance of functionality that is commensurate with the assumptions in STP's categorization (PRA and deterministic) process.

Attachment 8

Open item 18.1: STPNOC needs to describe to the staff the attributes of an engineering evaluation for design changes related to LSS and NRS SSCs that provides confidence of functionality absent the application of any of the engineering methods described in Appendix A to 10 CFR Part 100.

Response:

Summary of STPNOC's Proposed Methods

As summarized in our revision to proposed UFSAR Section 13.7.3.3.2, STPNOC proposes to use one or more of the following methods to determine that the procured item can perform its safety-related functions under design basis seismic conditions:

1. Vendor Documentation - The performance characteristics for the item, as specified in vendor documentation (e.g., catalog information, certificate of conformance), satisfy STP's seismic requirements.

2. Equivalency Evaluation - An equivalency evaluation determines that the procured item is equivalent to the item being replaced (e.g., a like-for-like replacement).

3. Engineering Evaluation - An engineering evaluation compares the differences between the procured item and original item and determines that the procured item can perform its safety-related function under design basis seismic conditions.

4. Engineering Analysis - In cases involving design changes or substantial differences between the procured item and replacement item, an engineering analysis may be performed to determine that the procured item can perform its safety-related function under design basis seismic conditions.

5. Testing - If none of the above methods are sufficient, commercial testing would be performed on the component. Margins, detailed documentation, and additional assurance specified in Appendix A to Part 100 would not be required in these tests, since the components are LSS/NRS and do not warrant this additional assurance.

Need for the Exemption

Some of the above methods do not constitute one of the three qualification methods in 10 CFR Part 100, Appendix A.VI.a (all of which involve use of tests or dynamic or static analysis). For example, the first option listed above (e.g., reliance on vendor catalog information) would not satisfy any of the criteria in Appendix A to Part 100. Therefore, from a regulatory perspective, STPNOC needs the exemption to be able to implement the options listed above.

Furthermore, as explained in the attached document, entitled *Risk-Informed Exemption for Seismic and Environmental Qualification*, STPNOC needs the exemption for practical reasons. STPNOC needs the exemption from the environmental and seismic qualification requirements, because in practice the benefits of a risk-informed special treatment program cannot be achieved unless NRC grants an exemption from essentially all of the special treatment requirements imposed by 10 CFR Parts 21, 50, and 100. If NRC were to grant an exemption from some of the special treatment requirements, but not from the environmental and seismic qualification requirements, STPNOC would lose a significant portion of the benefit of its risk-informed program. For example, STPNOC estimates that it would save approximately $1 million per year in procurement costs if safety-related LSS and NRS replacement parts and components could be procured using normal commercial practices (e.g., based upon a vendor's catalog listing). Absent an exemption to exclude safety-related LSS and NRS components from the scope of the environmental and seismic qualification requirements, essentially none of these components could be procured based upon a vendor's catalog listing, and STPNOC's procurement costs would be correspondingly higher.

Details Regarding the Use of STPNOC's Proposed Methods

In procuring a replacement component, STPNOC would first evaluate the component to ensure that its design is sufficient to satisfy its safety-related functions (e.g., that a pump can supply the requisite flow).

Next, STPNOC would identify the attributes that enable the component to perform its functions under design basis seismic conditions. For example, these attributes might include anchorage or material strength.

Next, STPNOC would perform a documented evaluation to determine whether the procured component meets or exceeds the attributes. This evaluation might consist of one or more of the following:

1) Documentation from the vendor (such as a certificate of conformance) that states that the component possesses the attributes (or in general can withstand the seismic loads applicable to the component).

2) An equivalency evaluation that demonstrates that the replacement component has the same attributes (e.g., configuration, material, rating) as the original component, and therefore constitutes a like-for-like replacement.

3) An engineering evaluation that demonstrates that the replacement component satisfies the attributes. Such an evaluation would consider factors such as:

   a) Seismic experience has shown that some components, such as motors and many mechanical components are seismically rugged and are able to perform their functions as long as they are properly mounted and anchored. Therefore, the engineering evaluation for such components would consist of an evaluation of the mounting and anchorage of the component to ensure that it is the same as or equivalent to that of the original (or in accordance with vendor recommendations).

   b) Seismic experience has shown that the functions of some components are insensitive to seismic events. This includes many passive components. It also includes many smaller components (such as fuses) that are part of a larger assembly, have little effect on the assembly during a seismic effect, and are not themselves affected by the seismic event. These components can be accepted without further analysis.

   c) Components that are mounted near the floor and the ground will have seismic loads that are similar to that based upon the seismic response spectra for the site, whereas components that are located high above the floor or ground will have a seismic load that is amplified. Given the low seismic response spectra for STP, the former components will experience relatively low seismic loads and therefore will receive a relatively simple evaluation. In contrast, the latter components will experience higher loads and therefore will receive a more detailed evaluation.

   d) STPNOC also intends to use various industry tools in evaluating the seismic adequacy of components. For example, EPRI TR-105489, *Generic Seismic Technical Evaluations for Replacement Items for Nuclear Power Plants – Item Specific Evaluations*, contains engineering evaluations that provide assurance of the functionality of more than 70 different types of components under seismic conditions. STPNOC will use these evaluations as appropriate.

e) Additionally, to the extent that a component is not discussed in EPRI TR-105489, STPNOC may use some of the methodologies contained in EPRI NP-7484, *Guideline for the Seismic Technical Evaluation of Replacement Items for Nuclear Power Plants.* For example:

- STPNOC would accept a component by determining that it is seismically insensitive. In making this determination, STPNOC would evaluate the following factors: the component has a negligible effect on the dynamics of its host; the component is securely fixed or constrained; the component does not change state or impair the safety function of the host; the component is not in the seismic load path of the host or has no seismic failure mode.

- STPNOC would accept a component by determining that it is seismically rugged. In making this determination, STPNOC would evaluate the following factors: the component is not potentially operability sensitive to earthquakes (e.g., it does not change state and does not contain lightly sprung items); the component does not significantly affect the earthquake dynamics of its host; the component is bounded by existing seismic design conditions (e.g., material strength, mass, anchorage).

4) In cases in which an engineering evaluation does not provide assurance of functionality under design basis seismic conditions, STPNOC may perform a seismic analysis for the component. This analysis might consist of a computer analysis of the performance of the component.

5) If a seismic analysis is not feasible, a commercial test of the component under simulated seismic conditions could be performed.

Assurance of Functionality

NRC has questioned whether the options listed above are sufficient to provide assurance of the functionality of components under design basis seismic conditions. As explained in the attached document, entitled *Risk-Informed Exemption for Seismic and Environmental Qualification*, STPNOC will be 1) using an Appendix B design control program to assure that the design of the components is sufficient to accomplish their functions under design basis seismic conditions; 2) continuing to apply the STP Appendix B corrective action program to assure that identified deficiencies in the components are corrected; and 3) providing the methods described above to ensure that the component can perform its functions under design basis seismic conditions. In total, these measures provide a level of assurance of functionality that is commensurate with the assumptions in STP's categorization (PRA and deterministic) process.

Attachment 9

RISK-INFORMED EXEMPTION FOR SEISMIC AND ENVIRONMENTAL QUALIFICATION

1.0 Introduction

South Texas Project (STP) has requested an exemption to exclude low safety significant (LSS) and non-risk significant (NRS) components from the scope of the environmental qualification (EQ) requirements in 10 CFR 50.49 and 50.55a(h) and from the seismic qualification requirements in 10 CFR Part 100, Appendix A.VI(a). The exemption request only applies to the qualification requirements in these regulations (e.g., to the requirements for testing, particular analyses, and documentation). Structures, systems, and components (SSCs) would still be required to be designed to perform their safety functions under applicable environmental and seismic conditions.

The purpose of this paper is to explain why: 1) exemption from the seismic and environmental qualification requirements is essential to the viability of the STP pilot program for risk-informing special treatment requirements; and 2) exemption from the seismic and environmental qualification requirements is consistent with providing reasonable assurance that the public health and safety will be protected.

2.0 Summary and Conclusions

Exemption from the environmental and seismic qualification requirements is essential to the viability of the STP pilot program because without such an exemption the principal benefits of a risk-informed special treatment program cannot be achieved. A key benefit STP hopes to achieve with its exemption request is the substantial cost savings that will result if safety-related LSS and NRS replacement parts and components can be procured using commercial practices (e.g., based upon a vendor's catalog listing). Absent an exemption, virtually all safety-related LSS and NRS components are subject to the environmental and/or seismic qualification requirements. As a result, replacements for these components can be procured only as nuclear-qualified components or, if purchased as commercial grade items, through expensive dedication of the replacements after receipt. As long as these requirements apply, the procurement costs for replacement LSS and NRS components will not be significantly reduced from their current levels. In addition, requiring special treatment for LSS and NRS components diverts management and station personnel attention from activities that are more significant to safety and plant reliability.

Application of the environmental and seismic qualification requirements to LSS and NRS components is not justified from a risk and safety perspective. STP's proposed commercial practices provide an appropriate level of assurance of functionality for safety-related LSS and NRS components, considering their very limited risk and safety significance. This assurance of functionality is achieved by: 1) using an Appendix B design control program to assure that the design of the components is sufficient to accomplish their functions under design environmental and seismic conditions; 2) continuing to apply the STP Appendix B corrective action program to assure that identified deficiencies in the components are corrected; and 3) ensuring that the reliabilities of components are commensurate with the assumptions in STP's categorization process (both the probabilistic risk assessment (PRA) categorization process and the deterministic categorization process).

Imposition of the additional testing, analysis and documentation requirements of the regulations is not justified because it does not result in a significant risk or safety benefit. All of the NRS components and approximately 90% of the safety-related LSS components lack sufficient risk significance to warrant modeling in the PRA. Therefore, extensive control over the reliability of these components would not achieve any significant risk benefit. With respect to the remaining 10% of the LSS components, STP's sensitivity studies demonstrate that even a 10-fold reduction in the reliability of all LSS components (which is an unrealistic and conservative bounding assumption) would result in only a 2% increase in core damage frequency (CDF) and large early release frequency (LERF). Additionally, the deterministic portion of STP's categorization process assures that NRS and LSS components have no more than a minor impact upon the ability of any system to prevent or mitigate accidents. Furthermore, STP's proposed commercial practices provide for engineering evaluations or analyses (including tests if necessary) to ensure that procured components are able to function under applicable environmental and seismic conditions. These controls provide a level of assurance of functionality of safety-related LSS and NRS components that is commensurate with their very limited risk and safety significance

3.0 Background

NRC's regulations in 10 CFR Parts 21, 50, and 100 contain special treatment requirements that impose controls to ensure the quality of safety-related components. These special treatment requirements go beyond normal commercial and industrial practices, and include quality assurance (QA) requirements, environmental and seismic qualification requirements, inspection and testing requirements, and Maintenance Rule requirements. These special treatment requirements apply not only to maintenance and operation of the plant, but also to procurement of replacement components.

Although STP is requesting an exemption to exclude LSS and NRS components from the scope of the special treatment requirements, STP will apply its proposed commercial practices to these components. These practices provide reasonable assurance that these components will be able to perform their safety functions, commensurate with their significance to safety. Additionally, STP will be evaluating non-safety-related high safety significant (HSS) and medium safety significant (MSS) components to determine whether enhanced treatment is warranted for their safety-significant functions. Thus, STP expects that this exemption will result in an overall risk benefit, or at least will be risk neutral.

STP estimates that, upon full implementation of this exemption, component and part replacement savings will exceed $1 million per year. Additionally, STP conservatively estimates that the streamlining and enhancements of processes for LSS and NRS components could result in a total savings of more than $1 million per year from the Station's present operating and maintenance budget. In addition, requiring special treatment for LSS and NRS components increases occupational radiation exposure and diverts management and station personnel attention from activities that are more significant to safety and plant reliability. Therefore, an exemption would be beneficial from both a safety and cost perspective.

4.0 Discussion

4.1 Need for the Exemption from the Qualification Requirements

In practice, the benefits of a risk-informed special treatment program cannot be achieved unless NRC grants an exemption from the environmental and seismic qualification requirements. If these requirements continue to apply, most of the benefit of STP's proposed risk-informed program would not be realized.

The effect of continued application of these requirements is attributable to the fact that all safety-related SSCs are subject to the seismic qualifications in Appendix A to Part 100, and most safety-related electrical components are subject to the EQ requirements in Sections 50.49 and 50.55a(h). If an exemption for safety-related LSS and NRS components were limited to the other special treatment requirements (i.e., quality assurance (QA) in Appendix B to Part 50, Part 21, and Section 50.55a; requirements for inservice testing (IST) and inservice inspection (ISI) under 10 CFR 50.55a; and maintenance under 10 CFR 50.65), all components would still be subject to special treatment requirements that would prevent application of STP's proposed commercial practices.

This conclusion is most readily apparent with respect to procurement of replacement parts and components. As mentioned above, STP estimates that it would save approximately $1 million per year in procurement costs if the special treatment requirements were fully risk-informed. Most of the savings is attributable to the fact that components that must be specially ordered from a vendor are substantially more costly than components that are procured using commercial practices (e.g., based upon a vendor's catalog listing). Absent an exemption to exclude safety-related LSS and NRS components from the scope of the environmental and seismic qualification requirements, essentially none of these components could be procured based solely upon a vendor's catalog listing. Instead, the components would need to be procured using special procurement specifications that comply with the environmental and seismic qualification requirements, or would require expensive testing by STP as part of a dedication process. Because the components could not be procured using commercial practices, a significant portion of the benefits of the exemption from the QA and other special treatment requirements would be lost.[1]

To a lesser extent, this conclusion also applies to the special treatment requirements applicable to a component after it has been procured. For example, electrical equipment that is environmentally qualified must be subject to special controls to ensure that its qualified status is not compromised during installation, maintenance, modification, and testing activities. As stated in IEEE-323-1974, IEEE Standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations, which is incorporated in NUREG-0588, which in turn is incorporated in 10 CFR 50.49(k):

- There is a need for "strict control" to assure that qualified equipment "is suitably applied, installed, maintained, and periodically tested."

- "Each modification to the equipment or to the equipment specification made after the type test . . . shall be evaluated to determine its effect on the equipment qualification . . . . Any changes in qualification basis, materials of construction, lubricant, mechanical stresses, clearances, manufacturing process, dielectric stress levels, etc., shall be identified and the equipment requalified if necessary."

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1 Furthermore, NRC Standard Review Plan 3.11 states that environmental qualification must be controlled in accordance with a quality assurance program that meets the requirements in Appendix B to Part 50. Therefore, even if NRC were to grant an exemption from the QA requirements in Appendix B, STP and its vendors may still need to apply an Appendix B QA program with respect to their environmental qualification activities.

Thus, absent an exemption from the qualification requirements, STP will be compelled to maintain "strict controls" over installation, maintenance, modification, and testing activities for qualified components, even if it is granted an exemption from the other special treatment requirements.

In summary, if NRC were to grant the exemption request with respect to QA, testing, and maintenance, but not with respect to environmental and seismic qualification, the exemption would provide little benefit to STP. In fact, this conclusion has been proven by experience - - STP has received little benefit from NRC's approval of the STP graded quality assurance (GQA) program in 1997, because STP was still required to comply with all of the other special treatment requirements. This is the fundamental reason why STP has requested an exemption from the full scope of special treatment requirements applicable to safety-related SSCs. In addition, requiring special treatment for LSS and NRS components increases occupational radiation exposure and diverts management and station personnel attention from activities that are more significant to safety and plant reliability.

4.2 Technical Justification for the Exemption

An exemption to exclude LSS and NRS components from the scope of the environmental and seismic qualification requirements is justified, based upon the lack of safety/risk importance of LSS and NRS components in protecting the health and safety of the public and the actions that STP is taking to assure the functionality of the components under applicable environmental and seismic conditions.

SECY-98-300 contains the following guidance for determining the level of assurance of functionality that is warranted for LSS and NRS components:

> "Under this option, SSCs of low safety significance (from a risk-informed assessment) would move from `special treatment' to normal industrial (sometimes called `commercial' treatment), but would remain in the plant and be expected to perform their design function but without additional margin, assurance or documentation associated with high safety significant SSCs."

Although NRC has not attempted to quantify the level of assurance of functionality that is needed, it is reasonable to conclude that the level of assurance should be commensurate with the risk and safety significance of the component in question. In other words, the level of assurance should be consistent with the assumptions used in STP's PRA and deterministic categorization processes.

Sufficient assurance of functionality of a safety-related LSS and NRS component can achieved by: 1) assuring that the design of the component is sufficient to accomplish its function; 2) assuring that the component is available to perform its function if needed; and 3) assuring that the component is reliable given the processes used for its manufacturing, installation, and maintenance. As discussed below, STP's exemption request accomplishes each of these three objectives.

4.2.1 Assurance of the Adequacy of the Design of Safety-Related LSS and NRS Components

The exemption will not alter the functional requirements applicable to LSS and NRS components. In particular, these components will still be required to be designed to function under applicable environmental and seismic conditions, even though they are not important from a risk perspective. Furthermore, STP is not requesting an exemption from the design control requirements in Criterion III of Appendix B to 10 CFR Part 50. Therefore, there is adequate confidence that the design of safety-related LSS and NRS components will be sufficient to perform their functions under applicable environmental and seismic conditions.

4.2.2 Assurance of the Availability of Safety-Related LSS and NRS Components

STP is not requesting an exemption from either Criterion XV or Criterion XVI of Appendix B to Part 50, which pertain to control of nonconformances and corrective actions. Therefore, when conditions adverse to quality are identified in safety-related LSS and NRS components, the conditions will be addressed in accordance with the Corrective Action Program. This will provide adequate confidence that the safety-related LSS and NRS components will be available if called upon to perform their function.

4.2.3 Assurance of the Reliability of Safety-Related LSS and NRS Components

The reliability of a component is affected by various factors, including its manufacturing, installation, testing, and maintenance. As discussed below, STP's proposed commercial processes assure that safety-related LSS and NRS components will have reliability levels commensurate with their risk and safety significance.

Component Type	Controls Needed for Risk Significance	Controls Needed for Safety Significance
Safety-Related NRS Components	NRS components are not sufficiently significant to warrant modeling in the PRA. As a result, even if it were assumed that safety-related NRS	Under STP's categorization process, NRS components have little or no impact on the ability of a system to prevent or

	components had low reliability, there would be little, if any, impact upon the results of the PRA. Therefore, from a risk perspective, only limited controls are needed for safety-related NRS components.	mitigate an accident. Thus, the reliability of these components is not a factor in the ability of a system to prevent and mitigate an accident. Therefore, from a safety perspective, only limited controls are needed for safety-related NRS components.
Safety-Related LSS Components Not Modeled in the PRA	Approximately 90% of all safety-related LSS components are not sufficiently significant to warrant modeling in the PRA. As a result, even if it were assumed that these safety-related LSS components had low reliability, there would be little, if any, impact upon the results of the PRA. Therefore, from a risk-perspective, only limited controls are needed for these safety-related LSS components.	Under STP's categorization process, LSS components have a minor or low impact on the ability of a system to prevent or mitigate an accident. Therefore, commensurate with their lack of safety significance, these components warrant only limited controls to assure their functionality.
Safety-Related LSS Components Modeled in the PRA	Approximately 10% of safety-related LSS components are modeled in the PRA. STP performed a sensitivity study to determine the impact on CDF and LERF from postulating a factor of 10 increase in the failure rates of all LSS components. As a result of this study, STP determined that the CDF and LERF increased by about 2%, which is an insignificant amount and within the acceptance criteria in Regulatory Guide 1.174. It is unrealistic to assume that a factor of 10 decrease in reliability of safety-related LSS components would occur from use of commercial practices. Therefore, from a risk perspective, limited controls would be acceptable.	Under STP's categorization process, LSS components have a minor or low impact on the ability of a system to prevent or mitigate an accident. Therefore, commensurate with their lack of safety significance, these components warrant only limited controls to assure their functionality.

As the above table demonstrates, commensurate with their very limited risk and safety significance, safety-related LSS components warrant only limited controls to assure their functionality under applicable environmental and seismic conditions.

As discussed below, STP's proposed controls are commensurate with these criteria.

Quantitative Evaluation of STP's Proposed Controls

For safety-related LSS and NRS components, STP is proposing to use the same commercial practices that it applies to non-safety-related components. As discussed below, available failure data demonstrate that the failure frequencies for similar types of safety-related and non-safety-related components are not significantly different.

STP has performed an analysis of data from the Institute of Nuclear Power Operations (INPO) Equipment Performance and Information Exchange System (EPIX). Nuclear industry data reporting to the Nuclear Plant Reliability Data System (NPRDS) spans the time period from 1977 through 1996. The EPIX Maintenance Rule and Reliability Information (MRRI) database includes component failure data since 1996. NPRDS component engineering data includes indication of safety class, thus enabling a distinction between safety-related component and non-safety-related component failure rates. While the MRRI database does not include a safety-class distinction, INPO was able to provide STP an MRRI database file for 1997-1999 data that is "back-linked" to NPRDS, thus providing indication of safety class. The NPRDS data and MRRI data were first analyzed separately then merged to provide a large-scope analysis for the purposes of this exemption. STP has developed a report, entitled "Safety-Related Versus Non-Safety-Related Equipment Failure Frequency Data Analysis for Nuclear Power Plants in the United States" dated April 6, 2000, describing this NPRDS-MRRI data analysis. This report is available upon request.

The scope of this merged NPRDS-MRRI analysis includes over 670,000 component records and over 166,000 component failure records. The historical data analyzed consisted of over 74 billion component-hours of experience for 33 types of components in the merged NPRDS-MRRI database. These data show that the calculated safety-related failure frequencies are generally greater than or roughly equivalent to those for corresponding types of non-safety-related components, based on historical NPRDS-MRRI data. This analysis shows that, of 33 component type categories investigated, 21 had higher safety-related failure frequencies than corresponding non-safety-related failure frequencies. Non-safety-related failure frequency values were significantly higher than corresponding safety-related failure frequencies in only one of the 33 categories (the "containment penetration" component type category). The analysis shows that, for most component types, the calculated safety-related failure frequencies are generally greater than or roughly equivalent to those for corresponding types of non-safety-related components, based on historical NPRDS and MRRI data.

In addition to the analysis of the data contained in the EPIX database, STP has performed limited data collection in support of an on-going Balance-of-Plant (BOP) model. The data collected covers active equipment necessary to support power production (e.g., feedwater and condensate pumps). The collected data indicate no apparent difference in the failure rates for normally operating motors between safety and non-safety-related equipment. These results support the conclusions of the data analysis of the EPIX data.

Based upon this data, STP concludes that use of its proposed commercial practices will not significantly affect the reliability of safety-related LSS and NRS components. Furthermore, to the extent that there will be any decrease in reliability of these components, it is reasonable to conclude that the decrease will be bounded by STP's sensitivity studies for LSS components. Therefore, STP's commercial practices provide sufficient assurance of functionality of safety-related LSS and NRS components, commensurate with their very limited risk and safety significance.

Qualitative Evaluation of STP's Proposed Controls

Safety-related LSS and NRS components currently installed in the plant have been fully qualified as required under Section 50.49, Section 50.55a(h), and Appendix A to Part 100. STP is not proposing to replace these components, absent good cause (such as failure or obsolesce). Therefore, there is adequate confidence that currently installed safety-related LSS and NRS components will continue to be able to perform their function under applicable environmental and seismic conditions.

To the extent that there may be a need to replace a safety-related LSS or NRS component, STP has controls that will provide a level of assurance (commensurate with their very limited risk and safety significance) that safety-related LSS and NRS components will be able to perform their functions under applicable environmental and seismic conditions. As part of its commercial procurement process, STP is proposing to use one or more of following steps to assure the functionality of safety-related LSS and NRS components:

- Vendor Documentation - The performance characteristics for the item, as specified in vendor documentation (e.g., catalog information, certificate of conformance), satisfy STP's technical requirements for environmental and seismic conditions.

- Equivalency Evaluation - An equivalency evaluation determines that the procured item has a form, fit, and function under design basis conditions that is equivalent to the item being replaced.

- Engineering Evaluation - An engineering evaluation compares the differences between the procured item and the original item and determines that the procured item can perform its safety-related function under applicable environmental and seismic conditions.

- Engineering Analysis - In cases involving design changes or substantial differences between the procured item and replacement item, an engineering analysis may be performed to determine that the procured item can perform its safety-related function under environmental and seismic conditions. The engineering analysis may be based upon a computer calculation, evaluations by multiple disciplines, test data, or operating experience related to the procured item over its expected life.

- Testing - If none of the above methods are sufficient, commercial testing would be performed on the component. Margins, documentation, and additional assurance specified in NRC regulations would not be required in these tests, since the components are LSS/NRS and do not warrant this additional assurance.

Documentation of the implementation of these methods will be maintained. Additionally, documentation will be maintained to identify the preventive maintenance needed to preserve the capability of the procured item to perform its safety-related function under applicable environmental and seismic conditions for its expected life.

STP recognizes that these controls are not equivalent to the special treatment requirements in NRC's regulations. However, these controls are sufficient to assure the reliability of safety-related LSS and NRS components under design basis environmental and seismic conditions, commensurate with the very limited risk and safety significance of LSS and NRS components. Therefore, these controls provide reasonable assurance that the public health and safety will be protected.