Nuclear Operating Company
South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

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

May 8, 2001
NOC-AE-01001098
File: G03.15
STI: 31284531

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 Request 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 reevaluated these Open Items and has enclosed revisions to responses to four of the Open Items. The four responses are attached, and include replies to Open Item 3.4, Open Item 3.5 and Open Item 10.1 and 10.2.

- Attachment 1 Open Item 3.4
- Attachment 2 Open Item 3.5
- Attachment 3 Open Item 10.1 and 10.2

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

J.J. Sheppard, Vice President
Engineering and Technical Services

A001

cc:

Ellis W. Merschoff
Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

John A. Nakoski
Addressee Only
U. S. Nuclear Regulatory Commission
Project Manager, Mail Stop OWFN/7-D-1
Washington, DC 20555-0001

Mohan C. Thadani
Addressee Only
U. S. Nuclear Regulatory Commission
Project Manager, Mail Stop OWFN/7-D-1
Washington, DC 20555

Cornelius F. O'Keefe
c/o U. S. Nuclear Regulatory Commission
P. O. Box 910
Bay City, TX 77404-0910

A. H. Gutterman, Esquire
Morgan, Lewis & Bockius
1800 M. Street, N.W.
Washington, DC 20036-5869

M. T. Hardt/W. C. Gunst
City Public Service
P. O. Box 1771
San Antonio, TX 78296

A. Ramirez/C. M. Canady
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

Jon C. Wood
Matthews & Branscomb
112 East Pecan, Suite 1100
San Antonio, Texas 78205-3692

Institute of Nuclear Power
Operations - Records Center
700 Galleria Parkway
Atlanta, GA 30339-5957

Richard A. Ratliff
Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, TX 78756-3189

R. L. Balcom/D. G. Tees
Houston Lighting & Power Co.
P. O. Box 1700
Houston, TX 77251

C. A. Johnson/R. P. Powers
AEP - Central Power and Light Company
P. O. Box 289, Mail Code: N5012
Wadsworth, TX 77483

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Open item 3.4: STPNOC needs to clarify how it addresses the significance of SSCs that function to protect the integrity of the containment for consequence mitigation in its categorization process.

Response

The STP PRA model describes containment response to a core damage event using four different containment response categories. One of the categories is Late Containment Failure, which makes up approximately 9% of all the containment responses to a core-damaging event. Late Containment Failure is defined as containment failure that occurs greater than 4 hours after vessel breach. Approximately 77% of all Late Containment Failures involve station blackout scenarios (i.e., no electric power). Loss of electric power presumes that no active SSCs (e.g., reactor containment fan coolers, containment spray, etc.) are available to mitigate the event. As a result, the reliability of active containment protection SSCs is not a significant factor in mitigating the risk of Late Containment Failures.

In response to a previous Request for Additional Information (RAI #21), a sensitivity analysis was performed to evaluate the impact of increased equipment failure rates postulated to result from implementation of the requested exemption. For purposes of the sensitivity analysis for RAI #21, the failure rates were increased by a factor of 10 for categorized LSS components that are modeled in the PRA. The resulting changes to the Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) were found to be within the guidance provided by Regulatory Guide 1.174.

To address concern with Late Containment Failures, a sensitivity analysis was performed to demonstrate the impact to the Late Containment Failure Frequency. This study used the same postulated increase in component failure rates including common cause failure rates (i.e., a factor of 10) for all categorized LSS components and non-categorized low ranking components in the PRA. The following table presents the results of this analysis:

	Current Average (events/reactor year)	Sensitivity Study λ_{LSS}*10 (events/reactor year)	Increase	% Increase
CDF	9.0781E-6	9.1590E-6	8.0900E-8	0.9%
LERF	1.3742E-7	1.3806E-7	6.400E-10	0.5%
Late Cont. Failure	8.2807E-7	8.5601E-7	2.794E-8	3.4%

Note, the results in the above table for CDF and LERF are different from the results presented in the response to RAI #21. This is largely due to a modeling update consistent with the "living" PRA policy at STP.

Regulatory Guide 1.174 does not provide guidance on acceptable increases in Late Containment Failure. However, a delta increase in the frequency of Late Containment Failure of 2.794E-8 is very small and comparable to delta increases in the CDF and LERF. The delta increases in CDF and LERF are small and consistent with the region III of Figures 3 and 4 in Regulatory Guide 1.174 and consistent with the intention of the Commission's Safety Goal Policy Statement. Consequently, the potential increase in the frequency of Late Containment Failure, even assuming a factor of 10 increase in low ranking components, is considered acceptable.

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:

Note: As used in this response, the term "component" includes items such as valves, pumps, vessels, and piping systems. It does not include supports, which are referred to separately. In addition, the term "pressure boundary" includes structural integrity considerations.

STPNOC has two risk-informed processes applicable to risk ranking passive functions. The first process is described in STPNOC's exemption request for plant SSCs (Categorization process). The second process involves risk-informed inservice inspection (RI-ISI), based upon an EPRI methodology (RI-ISI risk ranking process). This process has been endorsed by NRC Regulatory Guide 1.178, "An Approach for Plant-Specific Risk-Informed Decisionmaking: Inservice Inspection of Piping,"

STPNOC has obtained NRC approval for a relief request for RI-ISI of ASME Class 1 butt-welded piping under Regulatory Guide 1.178. In addition, STPNOC has recently submitted a similar relief request for Class 1 socket welded piping and Class 2 piping. STPNOC currently has no plans to submit a relief request for RI-ISI for Class 3 piping.

STPNOC has conservatively evaluated the pressure boundary functions of systems under the categorization process. For each fluid system that has been categorized, pressure boundary has been identified as a separate function and has been risk ranked in accordance with the categorization process. As detailed in the exemption request, this process involves answering five deterministic questions that provide for a consistent and documented approach to evaluating the consequences and likelihood of pressure boundary failures that could impact the capability of the system to perform its safety functions. As evidence of the robustness of this process, 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

STPNOC believes that its categorization process for the exemption is sufficiently robust for categorizing passive functions. However, to resolve this open item, STPNOC agrees to provide the following enhancements to its process for categorizing those functions.

<u>STPNOC's Proposed Exemption for the Pressure Boundary of ASME Class 1 and 2 Components and Supports</u>

For determining the final pressure boundary risk of Class 1 and 2 components for purposes of the exemption from 10 CFR 50.55a(g), STPNOC proposes to use the higher of the RI-ISI risk ranking or the categorization process pressure boundary risk. Since the RI-ISI process applies only to piping, STPNOC would utilize one of the following methods for determining the "RI-ISI" risk for components other than piping:

1) Assign such components the same pressure boundary risk as the associated section of piping. Where the associated piping has more than one risk (e.g., upstream and downstream of a valve), the higher risk will be used; or,

2) Perform a technical evaluation that supports a lower pressure boundary risk, based on such factors as differences in design features and/or degradation mechanisms that are less severe for these components than for the associated piping.

Supports would be assigned the same risk as the final pressure boundary risk of the associated component.

The following matrix summarizes STP's proposal with respect to pressure boundary risk for ASME Class 1 and 2 components:

		Categorization Process Pressure Boundary Risk	
		HSS/MSS	**LSS/NRS**
RI-ISI Risk Rank	**High or Medium**	Final pressure boundary risk of component is High or Medium. Component and its support(s) are not subject to exemption from 10 CFR 50.55a(g). Piping welds are subject to RI-ISI, with a risk rank of High or Medium, as applicable	Final pressure boundary risk of component is High or Medium. Component and its support(s) are not subject to exemption from 10 CFR 50.55a(g). Piping welds are subject to RI-ISI, with a risk rank of High or Medium, as applicable.
	Low	Final pressure boundary risk of component is High or Medium. Component and its support(s) are not subject to exemption from 10 CFR 50.55a(g). Piping welds are subject to RI-ISI, with a risk rank of Low.	Final pressure boundary risk of component is Low. Component and its support(s) are subject to exemption for applications involving pressure boundary considerations, e.g., 10 CFR 50.55a(g).

The 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). In addition, STPNOC is not proposing (for purposes of the exemption from 10 CFR 50.55a(g)) to categorize components lower than their RI-ISI risk ranking. Therefore, there is a sufficient technical justification for STPNOC's proposal to exempt Class 1 and 2 components, whose pressure boundary risk has been determined to be Low under the process described above, from special treatment requirements involving pressure boundary considerations, e.g., ASME Section XI requirements.

STPNOC has performed a comparison of the RI-ISI risk ranking of Class 1 and Class 2 piping against the categorization process pressure boundary risk of the associated systems. Results show that, with one exception, piping that is LSS or NRS under the categorization process is also risk ranked as Low under the RI-ISI methodology. The one exception is on the Auxiliary Feedwater (AF) system, where a small portion of the piping is assigned an RI-ISI risk of Medium compared to the categorization process pressure boundary risk of LSS. As indicated by the above matrix, that portion of the AF system will be assigned a pressure boundary risk of Medium and will not be subject to the exemption for applications involving pressure boundary considerations.

In order to provide additional assurance, STPNOC will perform periodic tests, up to and including tests that are equivalent to the Section XI tests, to ensure that the systems are fully intact and that sufficient safety margin is maintained. These tests will be performed on systems whose components have a final pressure boundary risk of Low under the process described above.

Thus, from a risk-informed perspective, STPNOC concludes that combining the categorization process pressure boundary risk and the RI-ISI risk adequately evaluates the safety significance of the passive functions involving the pressure boundary and structural integrity of Class 1 and 2 components.

<u>STPNOC's Proposed Exemption for the Pressure Boundary of ASME Class 3 Components and Supports</u>

As discussed above, STPNOC is not planning to request relief to extend its RI-ISI risk ranking process to ASME Class 3 components. Therefore, a RI-ISI ranking does not exist for these components. However, for the purpose of the exemption from 10 CFR 50.55a(g) for these components, STPNOC proposes to use the same NRC-endorsed EPRI RI-ISI methodology that has been used for Class 1 and 2 piping. Although the methodology and the resulting risk ranks would be the same as the RI-ISI ranking process, it is referred to herein as the risk informed pipe failure and consequence (RI-PFC) process. STPNOC would apply this methodology to Class 3 systems or portions of systems for which the exemption from 10 CFR 50.55a(g) is desired.

For determining the final pressure boundary risk of Class 3 components for the purposes of the exemption from 10 CFR 50.55a(g), STPNOC proposes to use the higher of the RI-PFC risk ranking or the categorization process pressure boundary risk. Since the RI-PFC process applies only to piping, STPNOC would utilize one of the following methods for determining the RI-PFC risk for components other than piping:

1) Assign such components the same pressure boundary risk as the associated section of piping. Where the associated piping has more than one risk (e.g., upstream and downstream of a valve), the higher risk will be used; or,

2) Perform a technical evaluation that supports a lower pressure boundary risk, based on such factors as differences in design features and/or degradation mechanisms that are less severe for these components than for the associated piping.

Supports would be assigned the same risk as the final pressure boundary risk of the associated component.

The following matrix summarizes STP's proposal with respect to pressure boundary risk for ASME Class 3 components outside containment:

		Categorization Process Pressure Boundary Risk	
		HSS/MSS	**LSS/NRS**
RI-PFC Risk Rank	**High or Medium**	Final pressure boundary risk of component is High or Medium. Component and its support(s) are not subject to exemption from 10 CFR 50.55a(g).	Final pressure boundary risk of component is High or Medium. Component and its support(s) are not subject to exemption from 10 CFR 50.55a(g).
	Low	Final pressure boundary risk of component is High or Medium. Component and its support(s) are not subject to exemption from 10 CFR 50.55a(g).	Final pressure boundary risk of component is Low. Component and its support(s) are subject to exemption for applications involving pressure boundary considerations, e.g., 10 CFR 50.55a(g).

In order to provide additional assurance, STPNOC will perform periodic tests, up to and including tests that are equivalent to the Section XI tests, to ensure that the systems are fully intact and that sufficient safety margin is maintained. These tests will be performed on systems whose components have a final pressure boundary risk of Low under the process described above.

Thus, from a risk-informed perspective, STPNOC concludes that, with the additional evaluations described above, its categorization process adequately evaluates the safety significance of the passive functions involving pressure boundary and structural integrity, of Class 3 components.

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 has revised its requested exemption with respect to the requirements for repair and replacement of LSS and NRS components and associated supports under Section XI of the ASME Code. STPNOC's revised request is described below. As this description explains, STPNOC's revised request is not based upon an expansion of the 1-inch NPS and smaller Section XI exemption to larger components. Also, STPNOC has clarified that the 'mixing' of ASME and alternate code requirements will not occur.

STPNOC's proposed exemption of LSS/NRS components from ASME Section XI repair and replacement requirements is limited to Class 2 and 3 components. STPNOC will continue to take advantage of the current provisions in Section XI, which provide relief for Class 1, 2, and 3 piping, valves, and fittings with a nominal pipe size of 1-inch or smaller, and associated supports. Section XI excludes these items from the scope of its replacement requirements and, by reference, from the requirements of ASME Section III, as long as the materials and primary stress levels are consistent with the requirements of the applicable construction code.

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

B. ASME Class 2 and 3 Components

STPNOC is proposing to use either of the alternatives described below for repair and replacement of ASME Class 2 and 3 components and their supports. The term 'item' below includes repairs, replacements, and fabrication and installation welds categorized as LSS or NRS.

- Alternative 1 - The repair or replacement item will meet the technical (but not the administrative) requirements of the ASME Section XI Code and of the ASME Construction Code, as incorporated in Section XI. Administrative requirements of the ASME Section XI Code include QA program, ANI contracts, repair program, replacement program, stamping, suitability evaluation, code data reports, records, and documentation. Administrative requirements of the ASME Section III Code are called out in Subsection NCA 'General Requirements' and include Code specific responsibilities, QA programs, authorizations, ANI contracts, and stamping.

- Alternative 2 – The repair or replacement item will meet the technical and administrative 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, ANSI B31 series for piping, ANSI B16.34 for valves, API 620 for 0 -15 psi storage tanks, and API 650 for atmospheric storage tanks.

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 and the LSS/NRS portion of the system will continue to comply with the most limiting applicable code requirements for the associated boundary.

STPNOC is not requesting an exemption from the fracture toughness 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 toughness requirements of these GDCs. In addition, Class 2 and 3 items will meet the fracture toughness requirements specified by the original design Code.

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 required by the Construction Code. Instead, the procurement process will ensure that the hydrostatic test required by the nationally-recognized Code, Standard, or Specification to which the component is constructed has been performed. If the piping in which the weld falls has been categorized as LSS or NRS, STPNOC will perform a post-maintenance leak test at operating pressures.

D. Preservice Examinations

Preservice examinations associated with repair or replacement activities on Class 1, 2, or 3 LSS/NRS components would be exempted in accordance with STPNOC's response to Open Item 3.5.