

7/2/15 Public Phone Call Agenda Items:

- Submittal Content (see attached Talking Points for a very abbreviated version of the draft submittal.)
 - Technical Basis
 - Deterministic (testing scope, includes coatings discussion)
 - Risk scope
 - Defense in depth and safety margin
 - Exemptions
 - LAR
 - UFSAR Changes
 - TS change
 - Monitoring
- “Stand alone” concept
- Computer codes and repeatability
- BAP/HLS – regulatory resolution (not technical detail)

STPNOC is applying the NRC acceptance of WCAP 16793 to address debris effects with respect to boric acid precipitation and hot leg switchover. STPNOC's analyses show there is less than 15g/FA for fibrous debris in cold-leg breaks within both the deterministic and risk-informed scope of the RoverD methodology such that the conclusions and conditions associated with the WCAP are directly applicable. Thus, in accordance with acceptance of the WCAP, STPNOC will follow the PWROG program and/or perform plant-specific evaluations to address BAP separately from the closure of GL 2004-02.

List of Attachments to Submittal:

1. STP Piloted Risk-Informed Approach to Closure for GSI-191
 - 1-1 Introduction
 - 1-2 Deterministic Basis
 - 1-3 Risk-Informed Basis
 - 1-4 Defense in Depth and Safety Margin
 - 1-5 Regulatory Basis Summary
 - 1-6 Summary and Conclusion
2. Requests for Exemptions for STP Piloted Risk-Informed Approach to Closure for GSI-191
 - 2-1 General
 - 2-2 Request for Exemption from 10CFR50.46(d)
 - 2-3 Request for Exemption from General Design Criterion 35
 - 2-4 Request for Exemption from General Design Criterion 38
 - 2-5 Request for Exemption from General Design Criterion 41
3. License Amendment Request for STP Piloted Risk-informed Approach to Closure for GSI-191
 - 3-1 Technical Specification Page Markups
 - 3-2 "Clean" Technical Specification Pages
 - 3-3 Technical Specifications Bases Page Markups (Information Only)
 - 3-4 STPEGS UFSAR Page Markups
4. List of Commitments
5. Definitions and Acronyms

Deterministic Basis

SEE DETAILED FILE

Risk-Informed Basis

SEE ROVERD DESCRIPTION IN DETAILED FILE

Defense in Depth and Safety Margin

The DID evaluation shows that there is adequate system capability to provide assurance that public health and safety are protected in the event that there is a LOCA that results in strainer blockage. It identifies operator actions that can be taken to mitigate the event and the robustness of the containment design.

The safety margin evaluation identifies margins and conservatisms in the design, analysis and construction that show that the actual probability of core damage due to strainer blockage, given a break at one of the 45 identified locations, is much less than the values calculated in the RoverD analysis. The evaluation credits very low susceptibility of the welds to degradation mechanisms that could lead to a LOCA, expected smaller actual amounts of debris that would be generated and transported to the sumps, little or no actual contribution to head loss from chemical effects, and margin in head loss evaluation.

The conclusion of the evaluation is that there is substantial DID and safety margin to demonstrate that the actual core damage frequency associated with effects of debris is much smaller than the Δ CDF from the RoverD analysis.

Defense in Depth

The proposed change to the licensing basis is consistent with maintaining DID in that the following aspects of the facility design and operation are maintained:

- Functional requirements and design configurations of systems
- Existing plant barriers to the release of fission products
- Design provisions for redundancy, diversity and independence
- Plant response to transients and other initiating events
- Preventative and mitigative capability of plant design features.

Effectiveness of Defense-In-Depth Actions

The effectiveness of the DID actions is shown to be acceptable when considering the following:

- STP EOPs are based on the approved industry standard Emergency Response Guidelines (ERGs). These symptom-based EOPs have generic or site-specific analyses that support them.
- STP Severe Accident Mitigation Guidelines (SAMGs) are based on approved industry standard guidance.
- The procedures are trained upon and evaluated as part of the classroom training.
- The DID actions are trained upon using the simulator to demonstrate effectiveness.
- The procedures that make the framework for the DID actions are evaluated

during the STP station review and approval process.

Evaluations

STP DID measures that are associated with the concerns of GSI-191 are evaluated by applying regulatory guidance and industry guidance.

Guidance in RG1.174

A reasonable balance is preserved among prevention of core damage, prevention of containment failure, and consequence mitigation.

The proposed change does not involve any equipment or design changes beyond the modifications that have been made in response to the concerns raised in GSI-191 nor does it involve any changes to the EOPs beyond the changes in place to address the concerns raised in GSI-191. There is no change to the strategies for the prevention of core damage, for prevention of containment failure, or for consequence mitigation. Thus the existing balance among these is preserved.

Over-reliance on programmatic activities as compensatory measures associated with the change in the licensing basis is avoided.

Programmatic activities associated with the proposed change include the ISI program, plant personnel training, RCS leak detection program, and containment cleanliness inspection activities.

System redundancy, independence, and diversity are preserved commensurate with the expected frequency, consequences of challenges to the system, and uncertainties (for example, no risk outliers).

The proposed change does not require any design change to these systems. Thus system redundancy, independence, and diversity are preserved. The proposed licensing basis change also does not call for any changes to the system operating procedures. The uncertainties using the risk-informed approach methodology have been examined in the PRA and there are no risk outliers.

Defenses against potential common-cause failures are preserved, and the potential for the introduction of new common-cause failure mechanisms is assessed.

Since the risk-informed approach does not involve any design changes to the equipment or changes to the operating procedures beyond those already taken in response to the concerns raised in GSI-191, it does not introduce any new common-cause failures or reduce the current plant defenses against common-cause failures

Independence of barriers is not degraded.

The proposed change does not involve any design change to these barriers (fuel, piping, building, HVAC filters). Thus the independence of the barriers is maintained and not degraded.

Defenses against human errors are preserved.

The proposed change does not involve any design change to the current equipment or for any change to operating procedures. The use of the methodology for the risk-informed approach does not change any of the EOPs that would be used or impose any additional operator actions or complexity. Thus the defenses that are already in place with respect to human errors are not impacted by the proposed licensing basis change.

The intent of the plants design criteria is maintained.

The proposed change does not involve any change to the design or design requirements of the current plant equipment associated with GSI-191.

The design and licensing basis descriptions of accidents requiring ECCS and CSS operation, including analysis methods, assumptions, and results provided in UFSAR Chapters 6 and 15 remain unchanged.

The proposed change does not involve a change to the ECCS acceptance criteria specified in 10 CFR 50.46

Prevention of Strainer Blockage

The primary means to delay or prevent this condition is to reduce the flow through the sump strainers by the following.

- STP has a continuous action step in the EOPs to remove the third CSS pump from service after conditions have been verified suitable.
- Additional pumps are removed as conditions allow
- Procedure guidance to delay depletion of the RWST for small to medium LOCAs
- For smaller LOCAs, it is possible to cooldown and depressurize the RCS to cold shutdown conditions before the RWST is drained to the switchover level. Therefore cold leg recirculation is not required to be established for these breaks; and sump blockage is not an issue.
- Surveillance procedures for inspection of sumps and strainers and to assure RWST is filled

Detection of Strainer Blockage

The primary methods for detection of this condition are:

Pump distress indications**Indication for core cooling degrading**

Mitigation of Strainer Blockage

Reduction in flow demand on the emergency sump strainer

Alternation of Recirculation Trains

Emergency Sump Strainer Backwash

RWST Refill and Realignment for Injection Flow

Injection Flow from Alternate Sources

Prevention of Inadequate Reactor Core Flow

Controlling (Reducing) Core Flow

Transfer to Combined Hot Leg / Cold Leg Injection Flow Paths

Detection of Inadequate Reactor Core Flow

Increasing core exit thermocouple (CET) temperature indication

Decreasing reactor water level indication

Increasing containment or auxiliary building radiation levels

Mitigation of Inadequate Reactor Core Flow

- Increase SI flow to refill the reactor vessel by depressurizing the RCS.
- Depressurize the RCS to inject the accumulators.
- Attempt to start any available SI pumps not running.
- Secure SI pumps to prevent pump damage, as necessary.
- As necessary, secure SI flow to prevent pump damage.
- Refill the RWST.
- Provide injection flow from the VCT using the charging pumps on a loss of emergency recirculation.
- Provide injection flow using the positive displacement pump, if needed.
- Provide core cooling by steaming through the steam generators.
- Transfer to RHR if determined acceptable by the TSC.
- Transfer to hot leg recirculation.
- Use of SAMGs per TSC direction

Barriers for Release of Radioactivity

The following evaluation demonstrates that the proposed change maintains sufficient safety margin for the current barriers for release of radioactivity, which are the fuel cladding, the RCS boundary, the RCB, and the emergency plan (EP) actions.

Fuel Cladding

The proposed licensing basis change does not make any change to the previous analyses and testing programs that demonstrate the acceptability of the ECCS for the initial phase of providing core cooling.

Reactor Coolant System Pressure Boundary

The proposed change does not make any change to the previous analyses and testing programs that demonstrate the integrity of the RCS.

Inservice Inspection Program**Reactor Coolant System Leak-Before-Break for RCS loop piping, pressurizer surge line and accumulator lines**

Note that approval of the application of LBB in the resolution of asymmetric loads in PWRS (USI A-2) established precedent for using that methodology to eliminate the need to consider certain large breaks (which include the 45 break locations identified in the STP application) to address an issue that could have affected ECCS performance and long term cooling.

Reactor Coolant System Weld Mitigation**RCS leakage detection****Containment Integrity**

The evaluation of sump performance using a risk-informed approach is not a component of the analyses that demonstrate containment integrity. Previous analyses show that the containment structure can withstand the peak pressures calculated without loss of integrity. The containment remains a low leakage barrier against the release of fission products for the duration of the postulated LOCAs.

Emergency Plan Actions

The proposed change to the licensing basis to use the methodology of a risk-informed approach does not involve any changes to the Emergency Plans.

Safety Margin [IN PROCESS]

The safety margin evaluation identifies margins and conservatisms in the design, analysis and construction that show that the actual probability of core damage due to strainer blockage, given a break at one of the 45 identified locations, is much smaller than the values calculated in the RoverD analysis. The evaluation credits very low susceptibility of the welds to degradation mechanisms that could lead to a LOCA, expected smaller actual amounts of debris that would be generated and transported to the sumps, little or no actual contribution to head loss from chemical effects, and margin in head loss evaluation.

1-4.2.1 Design Calculation Conservatisms

Non-Debris Head Loss Conservatisms

Sump Temperature

Sump Water Level

Pump Flow Rates

Clean Strainer Head Loss

1-4.2.2 Testing Conservatisms

1-4.2.2.1 Debris Source Term – Amount of Debris

Unqualified Coatings

100% Failure

Quantity in Containment

Marinite

1-4.2.2.2 Debris Source Term – Timing of Debris Arrival

1-4.2.2.3 Chemical Effects

STP Plant-Specific Test Results

1-4.2.3 In-Vessel Effects Conservatisms

Quantity of Debris

Thermal Hydraulic Analyses

1-4.2.4 Conclusions – Cumulative Effect of Safety Margins

Exemptions:

Approval of the exemptions will allow use of a risk-informed method to account for the probabilities and uncertainties associated with mitigation of the effects of debris following postulated LOCAs

The scope of the exemptions applies for all debris effects addressed in the risk-informed element of the STP RoverD methodology described in Attachment 1 that was used to respond to GL2004-02, and which are associated with LOCA break sizes and locations that potentially generate fine fibrous debris that exceeds the quantity bounded by STP plant-specific testing described in Attachment 1. That scope is generally described as breaks larger than approximately 12.8" ID in locations where a sufficient amount of fibrous debris can be generated and transported to the sump to exceed the amount of fine fibrous debris in the STP plant-specific testing described in Attachment 1. Forty-five (45) weld locations have currently been identified on the pressurizer surge line and RCS main loop piping. To minimize the potential that a later analysis could cause the specific locations to change, the requested exemptions are based on the breaks' ability to generate sufficient transportable debris, as described in RoverD. The key elements of each of the exemption requests are:

1. It applies only to the effects of debris as described in Attachment 1.
2. It applies only for LOCA breaks that can generate and transport fibrous debris that is not bounded by STP plant-specific testing.
3. It applies to any LOCA break that can generate and transport fibrous debris that is not bounded by STP plant-specific testing and is not limited to the 45 specific break locations noted in this application, provided that the Δ CDF associated with the break size remains in Region III of RG 1.174.

Special Circumstances Common to Proposed Exemptions to 10CFR50.46(d), GDC 35, GDC 38, and GDC 41

An objective of each of the regulations (10CFR50.46(d), GDC 35, GDC 38 and GDC 41) for which an exemption is proposed is to maintain low risk to the public health and safety through functions (ECCS and/or CSS) that are supported by the containment sump. The supporting analysis demonstrates that a risk-informed approach to sump performance is consistent with the Commission's Safety Goals for nuclear power plants and supports operation of those functions with a high degree of reliability. Consequently, the special circumstances described in 10CFR50.12(a)(2)(ii) apply to each of the exemptions proposed by STPNOC.

Specifically, 10CFR50.12(a)(2)(iii) applies:

Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated.

In order to meet a deterministic threshold value for containment debris loading, the amount of debris generating contributors in the STP plant design would need to be significantly reduced. Estimates of radiological exposure for insulation modifications are significant and on the order of hundreds of person-Rem, depending on the scope of the modifications.

The total dose expected to be expended for STP Units 1 and 2 in support of insulation replacement for GSI-191 is estimated to be 158 to 176 rem. These values significantly exceed the industry ALARA standard of 55 rem for collective radiation exposure.

The dose considerations discussed above demonstrate that compliance would result in substantial personnel exposure due to insulation modifications in the containment which is not commensurate with the expected safety benefit based on the results showing that the risk associated with GSI-191 concerns is less than the threshold for Region III in RG 1.174. Consequently, the special circumstances described in 10CFR50.12(a)(2)(iii) apply to each of the exemptions proposed by STPNOC.

Environmental Consideration

The proposed exemption has been evaluated and determined to result in no significant radiological environmental impacts associated with the implementation of the change.

STPNOC concluded that the proposed exemption meets the eligibility criteria for categorical exclusion set forth in 10CFR51.22(c)(9).

Request for Exemption from Certain Requirements of 10CFR50.46(d)

By the reference to the General Design Criteria (GDC), 10CFR50.46(d) incorporates their requirements into 10CFR50.46. For consistency with the proposed exemption to GDC 35, STP proposes exemption to 50.46(d). The result will be that the risk-informed methodology will be allowed rather than the currently prescribed demonstration of mitigation capability while assuming single failure. ***For the purposes of this application, “single failure” is applied in a broad sense to indicate a requirement for the use of a bounding calculation or other deterministic method to model LOCA debris effects, as discussed in Generic Letter 2004-02 and associated guidance documents such as NEI 04-07 and its associated NRC Safety Evaluation.*** STPNOC requests an exemption from that requirement in order to enable the use of a risk-informed method to demonstrate acceptable sump performance and LOCA debris mitigation and to validate assumptions in the Emergency Core Cooling System (ECCS) evaluation model.

Evaluation of Impacts on the Balance of 10CFR50.46 and Appendix K to Part 50

The exemption request to support closure for GL2004-02 for STP is intended to address ECCS cooling performance design as presented in 10CFR50.46(d) as it relates to imposing the requirements of the General Design Criteria.

For the purposes of demonstrating the balance of the acceptance criteria of 10CFR50.46, the design and licensing basis descriptions of accidents requiring ECCS operation, including analysis methods, assumptions, and results, which are provided in South Texas Project Electric Generating Station (STPEGS) Updated Final Safety Analysis Report (UFSAR) Chapters 6 and 15 remain unchanged. The performance evaluations for accidents requiring ECCS operation described in UFSAR Chapters 6 and 15, based on the Appendix K Large-Break Loss-of-Coolant Accident (LBLOCA) analysis, demonstrate that for breaks up to and including the double-ended severance of a reactor coolant pipe, the ECCS will limit the clad temperature to below the limit specified in 10CFR50.46 and assure that the core will remain in place and substantially intact with its essential heat transfer geometry preserved.

The requirements of 10CFR50.46(a)(1) remain applicable to the model of record that meets the required features of Appendix K. Approval of the requested exemption does not impact the current ECCS evaluation. This evaluation model remains the licensing basis for demonstrating that the ECCS calculated cooling performance following postulated LOCAs does not exceed the acceptance criteria.

The results of the risk-informed method demonstrate that the risk associated with GSI-191 meets the acceptance guidelines of RG 1.174. The current licensing basis for addressing the adequacy of ECCS to meet the criteria of 10CFR50.46, including the Appendix K Large-Break LOCA analysis and the associated Chapter 15 accident analysis for LOCA, remain in place

Justification for the Exemption Request

The exemption is authorized by law.

The NRC has authority under the Atomic Energy Act of 1954, as amended, to grant exemptions from its regulations if doing so would not violate the requirements of law. This exemption is authorized by law as is provided by 10CFR50.12 which provides the NRC authority to grant exemptions from Part 50 requirements with provision of proper justification. Approval of the exemption from 10CFR50.46(d) would not conflict with any provisions of the Atomic Energy Act of 1954, as amended, any of the Commission's regulations, or any other law.

The exemption does not present an undue risk to the public health and safety.

The probability of a large break LOCA is sufficiently low that the application of a risk-informed approach to evaluate the ability of the ECCS to meet 10CFR50.46 and relevant GDC with high probability and with low uncertainty, rather than using a calculational model using deterministic methods to achieve similar understanding, would have little effect on public risk. This is applicable to evaluating acceptable containment sump design in support of ECCS and CSS recirculation modes.

This exemption only affects 10CFR50.46(d), and does not impact the adequacy of the acceptance criteria for cladding performance that is important to maintain adequate safety margins.

The exemption is consistent with the common defense and security.

The exemption involves a change to the licensing basis for the plant that has no relation to the control of licensed material or any security requirements that apply to STP Units 1 and 2. Therefore the exemption is consistent with the common defense and security.

Special Circumstances

Specifically, 10CFR50.12(a)(2)(ii) applies:

Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.

An objective of 10CFR50.46 is to maintain low risk to the public health and safety through a reliable ECCS, as supported by the containment sump. The supporting analysis demonstrates that a risk-informed approach to sump performance is consistent with the Commission's Safety Goals for nuclear power plants and supports ECCS operation with a high degree of reliability. Consequently, the special circumstances described in 10CFR50.12(a)(2)(ii) apply.

Specifically, 10CFR50.12(a)(2)(iii) applies:

Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was

adopted, or that are significantly in excess of those incurred by others similarly situated.

The specific hardship is the excessive 158 – 176 rem occupational radiological dose that are estimated to be incurred for plant modifications to remove insulation. This was described in Attachment 2, above.

In conclusion, special circumstances in 10CFR50.12(a)(2)(ii) and 10CFR50.12(a)(2)(iii) are present as required by 10CFR50.12(a)(2) for consideration of the request for exemption.

Request for Exemption from Certain Requirements of General Design Criterion 35

- Same single failure – deterministic method interpretation as described for 10CFR50.46(d)

Justification for the Exemption Request

Fundamentally the same as for 50.46(d)

Request for Exemption from Certain Requirements of General Design Criterion 38

- Same single failure – deterministic method interpretation as described for 10CFR50.46(d)

Justification for the Exemption Request

Essentially the same as for 50.46(d) and GDC 35, with CSS added to the scope.

Request for Exemption from Certain Requirements of General Design Criterion 41

- Same single failure – deterministic method interpretation as described for 10CFR50.46(d)

Justification for the Exemption Request is fundamentally the same as for GDC 38.

Evaluation of Impacts on 10CFR50.67 and GDC 19

The risk-informed method provides confirmation of reliable ECCS and CSS performance as required for the licensing basis analyses that demonstrate the requirements of 10CFR50.67 and GDC 19. The method demonstrates that sump performance continues to support reliable plant design and operation and does not entail any exemption from 10CFR50.67 or GDC 19.

10CFR50.67 Accident Source Term

For STP Units 1 and 2, which have implemented the Alternative Source Term (AST), the design-basis LOCA radiological consequence LOCA analysis is a deterministic evaluation based on the assumption of a major rupture of the reactor coolant system piping and the assumption of the deterministic failure of the ECCS to provide adequate core cooling. This scenario results in a significant amount of core damage as specified in RG 1.183 and does not represent any specific accident sequence, but is representative of a class of severe damage incidents that were evaluated in the development of the RG 1.183 source term characteristics. Such a scenario would be expected to require multiple failures of systems and equipment and lies beyond the likely incidents evaluated for design-basis transient analyses. Since deterministic failure of ECCS is assumed at the onset of the accident by the analysis, the reliability of the containment emergency sumps with respect to ECCS operation does not affect the analysis for dose consequences. The regulation itself requires “reasonable assurance” and STPNOC believes the risk-informed method confirms reliable CSS operation as an input to the AST analysis and meets the “reasonable assurance” standard. Therefore, for the purposes of this exemption request, the current licensing basis analyses for 10CFR50.67 is considered to be met.

GDC 19 Control Room

With respect to accident dose, GDC 19 states: “Adequate radiation protection shall be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the body, for the duration of the accident.” The accident source term governed by 10CFR50.67 applies a 5-rem limit for control room dose, consistent with GDC 19. Therefore, STPNOC believes the discussion above with regard to 10CFR50.67 also applies to GDC 19. STPNOC also observes that the deterministic language that appears in GDC 35 and GDC 38 does not appear in GDC 19.

Also, STPNOC has determined that control room dose will be less than 5 rem if CSS operates for at least 4.25 hours post-LOCA. Based on the safety margins in the evaluation of the debris effects described in Attachment 1 and the conservatism in the dose calculation, STPNOC has confidence CSS will operate long enough to assure that the dose will be less than 5 rem.

Based on the review above, STPNOC believes no exemption to GDC 19 is needed.

**License Amendment Request for
STP Piloted Risk-Informed Approach to Closure for GSI-191**

Summary Description – Methodology Change and Technical Specification Change

In accordance with 10CFR50.59(c)(2)(viii), STP Nuclear Operating Company (STPNOC) requests an amendment to Operating Licenses NPF-79 and NPF-80 for South Texas Project (STP) Units 1 and 2 pursuant to 10CFR50.90. The proposed amendment will revise the licensing basis for the South Texas Project Electric Generating Station (STPEGS) Updated Final Safety Analysis Report (UFSAR) to allow the use of a risk-informed approach to address safety issues discussed in Generic Safety Issue (GSI) -191, "Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance" (Reference 1). The risk-informed approach is consistent with the guidance of NRC Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis".

In addition, STPNOC proposes to amend the STP Unit 1 and Unit 2 Operating Licenses to revise the Technical Specifications for the Emergency Core Cooling System and the Containment Spray System. The changes proposed for these TS would add a LCO, required action and completion time specific to the effects of debris to TS 3/4.5.2, "ECCS Subsystems – Tavg Greater Than or Equal to 350°" and TS3/4.6.2, "Depressurization and Cooling Systems – Containment Spray System". The proposed TS changes will align the TS with the risk-informed methodology change.

The proposed changes will apply only for the effects of debris as described in GSI-191 and GL2004-02.

The proposed change associated with the change in methodology is to use a risk-informed approach to determine the design requirements to address the effects of LOCA debris instead of a traditional deterministic approach. The details of the approach are provided in Attachment 1. The debris analysis covers a full spectrum of postulated LOCAs, including double-ended guillotine breaks (DEGBs), for all pipe sizes up to and including the design basis accident (DBA) LOCA, to provide assurance that the most severe postulated loss-of-coolant accidents are evaluated. The deterministic CLB will continue to apply to LOCA break sizes that generate fine fibrous debris that is bounded by STP plant-specific testing. The proposed methodology change will apply for LOCAs that can generate and transport fine fibrous debris that is not bounded by the plant-specific testing. STP conservatively relegates to failure the LOCA break sizes that can generate and transport fine fibrous debris that is not bounded by the STP plant-specific testing. STP applies NUREG 1829 to determine the break frequency for the smallest of those breaks to obtain the highest frequency, and uses that frequency as the Δ CDF for comparison to the criteria in RG 1.174. The results of the evaluation show that the risk from the proposed change is "very small" in that it is in Region III of RG 1.174. The methodology includes conservatisms in the plant-specific testing and in the assumption that all the unbounded breaks are relegated to failure.

The proposed TS change associated with the change in methodology will create actions and completion times in the ECCS and CSS TS. ECCS and CSS are the only TS systems that depend on the containment emergency sumps as a support system and are therefore the

only systems that are directly subject to the effects of debris. The purpose of the proposed changes is to establish actions that are associated with conditions that can potentially affect the effects of debris and providing a required action time that is commensurate with the very low risk associated with debris effects. The proposed LCO is based on the amount of debris tested in the STP plant-specific testing so that the determination of operability is performed without needing a risk assessment, which makes the process consistent with NRC guidance on operability determinations. The evaluation of the proposed change to the TS is performed in accordance with applicable guidance from RG 1.177 and compares Δ CDF and Δ LERF for extending the required completion time to restore ECCS and CSS made inoperable from debris effects. The change in completion time is assumed to be 90 days.

The proposed change to the UFSAR implements a risk-informed rather than a deterministic method to demonstrate compliance. In conjunction with the proposed LAR, STPNOC is also requesting exemptions from 10CFR50.46(d), GDC 35, GDC 38 and GDC 41, as provided in Attachments 2-1 through 2-4 to this letter.

Detailed Evaluation – Technical Specification Changes

STPNOC is proposing to change the TS for ECCS and CSS to specifically address the potential effects of debris. The ECCS and CSS are the only systems potentially affected by debris effects because they are the only systems that are supported by the RCB emergency sumps and strainers.

2.5.1 TS 3/4.5.2, “ECCS Subsystems – Tavg Greater Than or Equal to 350°F”

System Description – see Section 2.2.1, above

Debris Related LCO

STPNOC proposes to add a LCO specific to the effects of debris to this TS:

- e. An OPERABLE Reactor Containment Building emergency sump with respect to effects of LOCA debris by limiting the containment debris quantities to less than or equal to the STP debris analysis assumptions.

The applicability of the proposed LCO is limited to the effects of LOCA debris. The purpose of the LCO is to improve the clarity of the ECCS TS with respect to effects of LOCA debris to be consistent with the risk-informed licensing basis described in this application.

The operability with respect to debris is based on a quantity of debris; therefore, emergent nonconforming or degraded conditions can be evaluated in a deterministic process based on analyzed debris conditions. No quantitative risk assessment is necessary, so the evaluation process is consistent with the guidance in Part 9900 of the NRC Inspection Manual that does not allow the use of risk in an operability determination.

The change to the ECCS TS is proposed only for TS 3.5.2, which applies in MODE 1, 2, and 3. The risk-informed debris evaluation is performed with the plant assumed to be at-power when the initiating event LOCA occurs. Consequently, the debris generation and transport is initiated from normal operating temperature and pressure conditions. Those conditions maximize the break zones of influence and initial decay heat.

Debris Related Required Action

STPNOC proposes the required action below.

- c. With less than the required ECC Systems OPERABLE due to potential effects of debris (LCO e), perform the following:

1. Immediately initiate action to implement compensatory actions,

AND

2. Within 90 days restore the affected system(s) to OPERABLE status,

OR

Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours

The required action to implement compensatory action is based on the very low contribution by LOCA generated debris to the risk of core damage, and is a reasonable response to minimize the potential increase in risk from the debris source. Typical compensatory action would include actions such as:

- Remove the debris or source of debris or take action that would prevent transport of the debris to the emergency sump
- Defer maintenance that would affect availability of the affected systems and strainers
- Increase frequency of RCS leak detection monitoring
- Brief operators on LOCA debris management actions

The requirement to be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours is consistent with the other required actions in the ECCS TS

Debris Related Required Completion Time

As described in the discussion of the proposed LCO, the action applies only for the potential effects of debris. Under the current TS, STPNOC would likely apply the RMTS PRA Functional allowance in NEI 06-09 Section 2.3.1 since the ECCS would still be functional for small and medium break LOCAs. Based on the risk evaluation in RoverD, STPNOC expects the 30-day "backstop" RMTS completion time would apply. Under CTS, STPNOC would monitor and manage risk based on plant configuration to until operability was restored or the 1E-05 CDP limit was reached.

The proposed required completion time of 90 days is based on there being very small incremental increase in risk by increasing the completion time from 30 days to 90 days. Unlike RMTS, it is a set time and not subject to the risk management requirements of RMTS. Also, because the required completion time is longer than the 30-day RMTS backstop time, RMTS does not apply for the proposed action. The advantages of the 90-day completion time are:

1. It provides clarity for the operators with regard to application of the TS for degraded or nonconforming conditions associated with the potential effects of LOCA debris.
2. It eliminates the need to apply the “PRA Functional” feature of RMTS, which simplifies application of the TS.
3. It improves the usefulness of the STP pilot application as a precedent for other licensees.

2.5.2 TS 3/4.6.2.1, “Depressurization and Cooling Systems – Containment Spray System”

System Description – see Section 2.2.1, above

Debris Related LCO

The debris related LCO for CSS is very similar to the LCO for ECCS and its discussion is essentially the same as that presented for ECCS in 2.5.1, above. Specifically, STPNOC proposes to add LCO 3.6.2.1.b and make an administrative change to designate the current LCO as 3.6.2.1.a:

- a.** Three independent Containment Spray Systems shall be OPERABLE with each Spray system capable of taking suction from the RWST and transferring suction to the containment sump
- b. The Reactor Containment Building emergency sumps shall be OPERABLE with respect to effects of LOCA debris by limiting the containment debris quantities to less than or equal to the STP debris analysis assumptions.

Because the CTS for CSS applies in MODE 1, 2, 3, and 4, STPNOC is proposing appropriate wording in the CSS TS to limit the debris related requirements to MODE 1, 2, and 3. STPNOC is not proposing to apply a debris-specific action in MODE 4 because STP PRA evaluations have not been extended to MODE 4. In addition, there is little potential for debris related effects in MODE 4 and the CTS action are considered to be adequate.

APPLICABILITY: LCO a. MODES 1, 2, 3, and 4
LCO b. MODES 1, 2, and 3

Debris Related Required Action

The proposed required action for CSS is essentially the same as that for ECCS:

- c. With less than the required Containment Spray Systems OPERABLE due to potential effects of debris (LCO b), perform the following:

- 1. Immediately initiate action to implement compensatory actions,

AND

- 2. Within 90 days restore the affected system(s) to OPERABLE status,

OR

Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours

Debris Related Required Completion Time

As with ECCS, STPNOC is proposing a 90-day required completion time. Also, similar to ECCS, RMTS applies to CSS, so the same elements of the ECCS discussion above apply for CSS.

2.5.3 Technical Specification Change Risk Assessment

The RoverD description in Attachment 1 provides the overall quantification of Δ CDF and Δ LERF for the methodology change. These metrics represent the change in risk associated with assuming failure for the scope of LOCAs that generate amounts of debris that is not bounded by plant-specific testing.

The risk associated with the proposed change to the TS is the risk associated with allowing a longer completion time to restore nonconforming or degraded conditions caused by potential effects of debris.

As discussed above, RMTS applies for ECCS and CSS. Briefly, RMTS provides a 30-day backstop or a $1\text{E-}05$ CDP limit. From an upper limit perspective, the CDF that corresponds to reaching $1\text{E-}05$ in 30 days is about $1.2\text{E-}04/\text{yr}$. Using RMTS CDP of $1\text{E-}05$ and 90 days for a backstop reduces that CDF limit to about $4\text{E-}05/\text{yr}$. For comparison, the RoverD geometric mean frequency for the break size that is deterministically mitigated is approximately $1.2\text{E-}07/\text{yr}$, or more than 2 orders of magnitude smaller. The conclusion from this bounding perspective is that the additional LOCA debris related risk from the proposed 90-day required completion time is insignificant in comparison to the small risk that is currently permitted by RMTS.

STPNOC has evaluated the proposed change in accordance with the guidance of RG 1.177 and evaluated the incremental conditional core damage probability (ICCDP) and the incremental conditional large early release probability (ICLERP).

ICCDP AND ICLERP TO BE ADDED

3.0 Evaluation of Defense-in Depth and Safety Margin [Will reference previous descriptions]

4.0 Implementation and Monitoring Program

Design modifications addressing GSI-191 concerns, including installation of new sump strainers and replacement of problematic insulation, have been previously implemented using the STP design change process.

STPNOC has implemented procedures and programs for monitoring, controlling and assessing changes to the plant that have a potential impact on plant performance related to GSI-191 concerns. These provide the capability to monitor the performance of the sump strainers and the ability to assess impacts to the inputs and assumptions used in the PRA and the associated engineering analysis that support the proposed change. Programmatic requirements ensure that the potential for debris loading on the sump does not materially increase. These include:

- Programs and procedures have been implemented to evaluate and control potential sources of debris in containment:
 - Technical Specification Surveillance Requirements implemented by STP procedures require visual inspections of all accessible areas of the containment to check for loose debris, and each containment sump to check for debris, as described in Section 4.1.3.
 - The STP Design Change Package procedure includes provisions for managing potential debris sources such as insulation, qualified coatings, addition of aluminum or zinc, and potential effects of post-LOCA debris on recirculation flow paths and downstream components. The procedure has been augmented to explicitly require changes that involve any work or activity inside the containment be evaluated for the potential to affect the following:
 - Reactor coolant pressure boundary integrity
 - Accident or post-accident equipment inside containment
 - Quantity of metal inside containment
 - Quantity or type of coatings inside containment
 - Thermal insulation changed or added
 - Post-LOCA recirculation flow paths to the emergency sumps
 - Post-LOCA recirculation debris impact on internals of fluid components
 - Addition or deletion of cable

A 10CFR50.59 screening or evaluation is required to be completed for all design changes. This process ensures that new insulation material that may differ from the initial design is evaluated for GSI-191 concerns.

- Programs to ensure that Service Level 1 protective coatings used inside containment are procured, applied, and maintained in compliance with applicable regulatory requirements. Additional details are discussed in the STP response to Generic Letter 98-04 (Reference 15). In addition, procedures have been implemented to govern the use of signs and labels inside containment.
- As part of the STP Corrective Action Program, condition reports written due to adverse conditions identified during the containment inspections or containment emergency sumps and strainers surveillances are reviewed for impact on Maintenance Rule scoped systems, as appropriate.
- The STP Maintenance Rule program includes performance monitoring of functions associated with ECCS and CSS, including sump recirculation. The inclusion of the ECCS and CSS into the Maintenance Rule program and the assessment of acceptable system performance provide continued assurance of the availability for performance of the required functions.
- PRA Updates: STP will continue to use its normal process to evaluate plant changes for impact on the PRA, and enter any significant findings or conclusions into the Corrective Action Program as appropriate.
- Licensed Operator Training: Licensed Operators are trained on indications of and actions in response to sump blockage issues related to GSI-191, and performance is evaluated during training scenarios designed to simulate plant responses.

Operator actions required to respond to emergency sump clogging are currently trained on a biennial basis in the Licensed Operator Requalification program. Simulator training objectives are trained every two years on the topics of transfer to cold leg recirculation, transfer to hot leg recirculation, and total loss of Emergency Sump recirculation capability. Indications of sump blockage are included as part of the Licensed Operator training administered for Emergency Operating Procedure (EOP) performance of switchover activities in addition to general familiarization with the indications of loss of pump suction. Licensed Operator Training includes the monitoring of operating ECCS and CSS pumps during the evolution for transfer to cold leg recirculation (0POP05-EO-ES13, "Transfer To Cold Leg Recirculation") and hot leg recirculation (0POP05-EO-ES14, "Transfer To Hot Leg Recirculation"). Operator training also includes actions required on a total loss of Emergency Sump recirculation capability (0POP05-EO-EC11, "Loss of Emergency Coolant Recirculation"). 0POP05-EO-EC11 is trained on a biennial basis in the Licensed Operator Requalification program (LOR), and simulator scenarios are utilized for this training.

- Quality Assurance (QA): The STP QA program is implemented and controlled in accordance with the Operations Quality Assurance Plan (OQAP) and is applicable to SSCs to an extent consistent with their importance to safety, and complies with the requirements of 10CFR50, Appendix B and other program commitments as appropriate.

The QA Program is implemented with documented instructions, procedures, and drawings which include appropriate quantitative and qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished. Procedures control the sequence of required inspections, tests, and other operations when important

to quality. To change these controls, the individual procedure must be changed and a similar level of review and approval given to the original procedure is required. Such instructions, procedures, and drawings are reviewed and approved for compliance with requirements appropriate to their safety significance.

QA program controls are applied to safety-related SSCs to provide a high degree of confidence that they perform safely and activities are performed as expected. The rigorous controls imposed by the QA program provide adequate quality control elements to ensure system component reliability for the required functions.

- STPNOC has adopted other programs that help provide early detection and mitigation of leakage in other applications. The proposed change does not involve any changes to ASME Section XI inspection programs or mitigation strategies that have been shown effective in early detection and mitigation of weld and material degradation in Class I piping applications.

4.3 No Significant Hazards Consideration Determination

STPNOC has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10CFR50.92, "Issuance of amendment," as discussed below:

- 1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?**

Response: No.

The proposed methodology change for assessment of debris effects adds the results of a risk-informed evaluation to the UFSAR that concludes the ECCS and CSS will operate with a high probability following a LOCA when considering the impacts and effects of debris accumulation on containment emergency sump strainers in recirculation mode, as well as core flow blockage due to in-vessel effects, following loss of coolant accidents (LOCAs). Complementary changes to the ECCS and CSS TS create debris-specific limiting conditions for operation and longer, risk-informed, required completion times specific to debris effects.

The proposed methodology and TS changes do not implement any physical changes to the facility or any SSCs, and do not implement any changes in plant operation. The proposed methodology change confirms that required SSCs supported by the containment sumps will perform their safety functions with a high probability, as required, and does not alter or prevent the ability of SSCs to perform their intended function to mitigate the consequences of an accident previously evaluated within the acceptance limits. The safety analysis acceptance criteria in the UFSAR continue to be met for the proposed methodology change. The proposed methodology and TS changes do not affect initiating events because both changes address existing initiating events; i.e., loss of coolant accidents. The proposed changes do not significantly affect the operation of the containment systems needed to ensure that there is a large margin between the temperature and pressure conditions reached in the containment and those that would lead to failure so that there is a high degree of confidence that damage of the containment cannot occur.

The calculated risk associated with the proposed methodology change is very small and less than the threshold for Region III as defined by RG 1.174, for both CDF and LERF. In accordance with the guidance of RG 1.174, there is substantial safety margin and defense in depth that provide additional confidence that the design basis functions are maintained. The calculated risk associated with the TS change to allow a 90-day required completion time for LOCA debris related degraded and nonconforming conditions is very small and within the bounds of the calculations for the methodology change.

The dose consequences were considered in the assessment of the need for exemption to 10CFR50.67 and the evaluation determined that the risk-informed methodology resulted in no change in the STP compliance with that regulation. Quantitative evaluation of the effects on dose using input from the risk-informed approach shows no significant increase in consequences.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of any the accident previously evaluated in the UFSAR.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change is a risk-informed analysis of debris effects from accidents that are already evaluated in the STP UFSAR; no new or different kind accident is being evaluated. The change neither installs nor removes any plant equipment, nor alters the design, physical configuration, or mode of operation of any plant structure, system or component. The proposed change does not introduce any new failure mechanisms or malfunctions that can initiate an accident. The proposed change does not introduce failure modes, accident initiators, or equipment malfunctions that would cause a new or different kind of accident. Therefore, the proposed change does not create the possibility for a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The proposed change does not involve a change in any functional requirements, the configuration, or method of performing functions of plant SSCs. The effects from a full spectrum of LOCAs, including double-ended guillotine breaks for all piping sizes up to and including the largest pipe in the reactor coolant system, are analyzed. Appropriate redundancy and consideration of loss of offsite power and worst case single failure are retained, such that defense-in-depth is maintained.

Application of the risk-informed methodology showed that the increase in risk from the contribution of debris effects is very small as defined by RG 1.174 and that there is adequate defense in depth and safety margin. Consequently, STP determined that the risk-informed method demonstrates the containment sumps will continue to support the ability of safety related components to perform their design functions when the effects of debris are considered. The proposed change does not alter the manner in which safety limits are determined or acceptance criteria associated with a safety limit. The proposed

change does not implement any changes to plant operation, and does not significantly affect SSCs that respond to safely shutdown the plant and to maintain the plant in a safe shutdown condition. The proposed change does not significantly affect the existing safety margins in the barriers for the release of radioactivity. There are no changes to any of the safety analyses in the UFSAR.

Defense in depth and safety margin was extensively evaluated for the methodology change and the associated TS changes. The evaluation determined that there is substantial defense in depth and safety margin that provide a high level of confidence that the calculated risk for the methodology and TS changes is conservative and that the actual risk is likely much lower.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, STPNOC concludes that the proposed amendments do not involve a significant hazards consideration under the standards set forth in 10CFR50.92(c), and accordingly, a finding of “no significant hazards consideration” is justified.

4.4 Conclusion

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission’s regulations contingent upon approval of the exemption requested in Attachment 2 to this letter, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 Environmental Consideration

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10CFR51.22(c)(9). Therefore, pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

**Technical Specification Page Markups
(SEE DRAFT)**

UFSAR Markups

[DEVELOPMENT STILL IN-PROCESS, PRIMARILY FOR APP. 6A]

STPEGS UFSAR Page Markups [SEE DRAFT FOR DETAILS]

The changes to the South Texas Project Electric Generating Station (STPEGS) Updated Final Safety Analysis Report (UFSAR) are provided for NRC review and approval for the purpose of addressing Generic Safety Issue (GSI)-191, "Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance" and closing GL2004-02 for STP Units 1 and 2. The risk-informed approach following the guidance of RG 1.174 provided as justification for the changes. Future changes to the revised parts of the UFSAR will be done in accordance with 10CFR50.59 since the criteria of 10CFR50.59 are still the relevant and appropriate change criteria.

The design and licensing basis descriptions of accidents requiring ECCS operation, including analysis methods, assumptions, and results provided in UFSAR Chapters 6 and 15 remain unchanged. The performance evaluations for accidents requiring ECCS operation described in Chapters 6 and 15, based on the South Texas Project Units 1 and 2 Appendix K Large-Break Loss-of-Coolant Accident (LBLOCA) analysis, demonstrate that for breaks up to and including the double-ended guillotine break of a reactor coolant pipe, the ECCS will limit the clad temperature to below the limit specified in 10CFR50.46, and assure that the core will remain in place and substantially intact with its essential heat transfer geometry preserved.

The results of the risk-informed method determine acceptable containment sump design and performance with regard to mitigation of the effects of LOCA debris and amend the licensing bases for the supported ECCS and CSS specified functions required during recirculation mode following postulated LOCAs, for the purpose of addressing GSI-191 and closing GL2004-02.