NRC FORM 658
(9-1999)

U.S. NUCLEAR REGULATORY COMMISSION

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DATE OF MEETING
04/11/2000

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Docket Number(s)	**05000498 & 05000499**
Plant/Facility Name	**South Texas Project, Units 1 and 2**
TAC Number(s) (if available)	**MA6057 and MA6058**
Reference Meeting Notice	**2000-0299**
Purpose of Meeting (copy from meeting notice)	**Discuss the details of the licensee's process for risk ranking components as it relates to the risk-informed multipart exemption request to the special treatment req in 10 CFR Part 50**

NAME OF PERSON WHO ISSUED MEETING NOTICE	TITLE
John A. Nakoski	**Senior Project Manager**

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U.S. Nuclear Regulatory Commission

and

STP Nuclear Operating Company

Meeting on

Risk-Categorization Process for

Exemption from Special Treatment Requirements

April 10 – 11, 2000

TWFN Room T-2B3

Agenda

April 10, 2000

10:00 a.m.	Introduction	John Nakoski, NRC
10:05 a.m.	Opening Remarks	Joe Sheppard, STP
10:15 a.m.	NRC Comparison GQA and Exemption Categorization	Steve Dinsmore, NRC
10:30 a.m.	STP Overview Categorization Enhancements	Glen Schinzel, STP
10:45 a.m.	Overview Working Group Activities	Russ Lovell, STP
11:50 a.m.	Process Summarization	Glen Schinzel, STP
12:00 – 1:15 p.m.	LUNCH	
1:15 p.m.	Working Level Discussion	All
4:45 p.m.	Close – Tuesday's Agenda	Bob Gramm, NRC Glen Schinzel, STP

Agenda

April 11, 2000

9:00 a.m.	Kickoff	John Nakoski, NRC
9:05 a.m.	Recap Monday's Outcomes	Bob Gramm, NRC Glen Schinzel, STP
9:15 a.m.	Working Level Discussion	All
10:45 a.m.	Break	
11:00 a.m.	STP Perspective on Meeting	Glen Schinzel, STP
11:30 a.m.	NRC Perspective on Meeting	NRC Staff
11:50 a.m.	Future Actions/Closeout	Glen Schinzel, STP John Nakoski, NRC
12:00 p.m.	MEETING CLOSED	

GRADED QUALITY ASSURANCE

compared to

RISK INFORMED SPECIAL TREATMENT EXEMPTION

- Compare GQA submittal success path with current exemption request

- There is a linkage between the Safety Significant Categorization process and the application it supports (e.g. the potential change in risk)

RG-1.174 Appendix A "Use of Risk Importance Measures to Categorize Structures, Systems, and Components with respect to Safety Significance"

- The potential impact of the application on risk is what determines which SSCs are safety significant

The Categorization assumes that there will be only minor changes in SSC reliability and negligible increases in CCFs.

GQA explicitly defined what the changes were in each of the nine QA elements that were modified.

- Each change found acceptable and placed in OQAP

- Potential impacts were identified and evaluated. For example,
  - potential increases in unavailability due to maintenance errors
  - potential reduced independence might increase possibility of CCF

- Potential impact judged to cause only minor increase in unreliability
  - Minor - not quantitatively defined but qualitatively defined by accepting that improved monitoring and feedback (including tracking of degradation) would offset any risk increase

Similar success path for special treatment exemption not yet clear

- Unclear what changes in treatment will be made
- Without knowing the changes in treatment, very difficult to approve the categorization. For example,*
  - Increased test intervals incorporated in PRA and showed xE-x change in risk
  - Redundant SSCs exempt from EQ are spatially separated and will not be all exposed to the same harsh environment when demanded

* Examples are staff examples for illustration, not STP suggestions

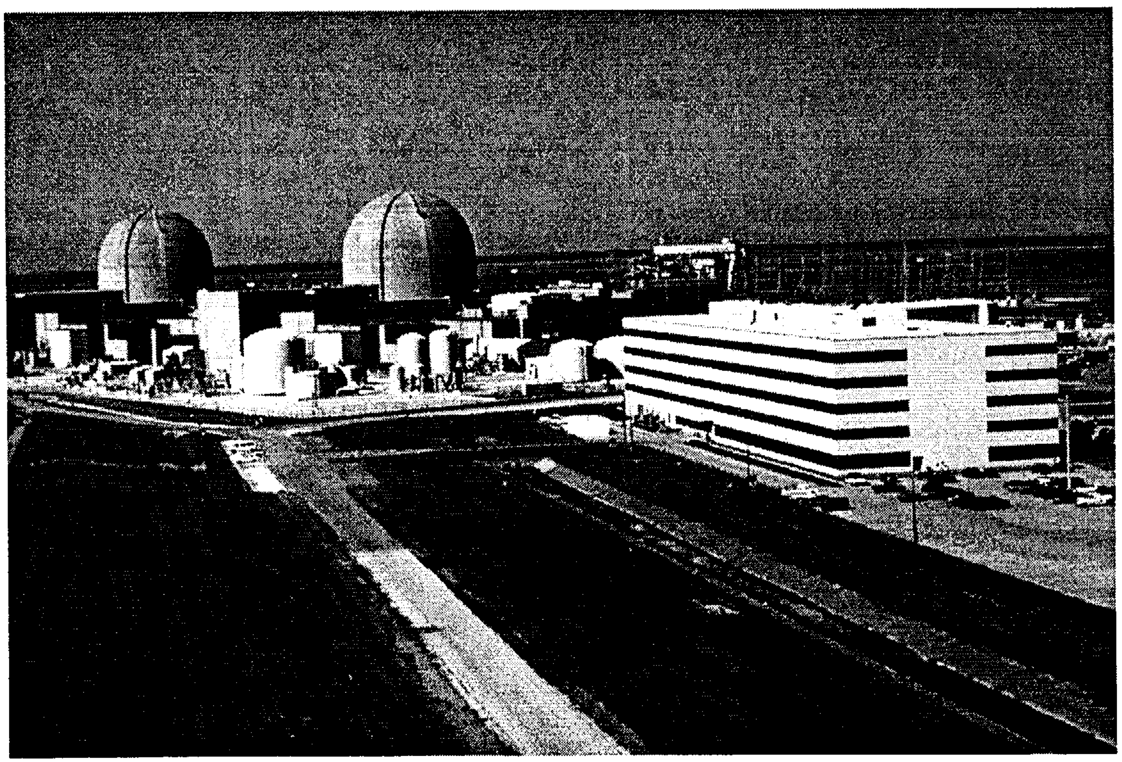
Conclusion on the change in risk associated with implementation of GQA

> "Although it could result in a decrease in reliability of some LSS and MSS-2 SSCs, based on increased QA controls on HSS and MSS nonsafety-related SSCs and appropriate monitoring of equipment performance, the staff expects that the GQA process would likely result in an overall decrease in risk."

We need a technical discussion describing how the categorization process and the subsequent changes in special treatment provide reasonable assurance that,

- potentially large risk changes from treatment changes are mitigated by the categorization process
- aggregate of small risk changes expected to be "minor"

STP/NRC Working Group Meeting to Address GQA Process-Related Questions and Responses to the RAI's



April 10-11, 2000
Rockville, MD

STPNOC Attendees

- Joe Sheppard-VP Engineering &Tech Services
- Russ Lovell-Working Group Chair/SRO
- Rick Grantom-Expert Panel Member
- Scott Head-Working Group Alt Chair
- Alan Moldenhauer-Working Group Alt Chair
- Glen Schinzel-Graded QA Implementation
- Ralph Chackal-Working Group Facilitator
- Steve Frantz-Counsel

Opening Insights

- STP is piloting the risk categorization process in support of NRC Option 2 efforts
- The risk categorization process will naturally evolve as we learn insights into the process - this provides benefits to both NRC and industry
- Part of the piloting effort also includes collaborative phone calls between STP and NRC to clarify questions and draft responses on the RAIs - this is a value-added process
- We believe the categorization process developed by STP represents a robust approach with a sound technical basis

Overview of the STP Risk Categorization Process Enhancements

- Working Group rebaselined the EW, RA, DG, and CV Risk Significant Basis Documents following grant of the GQA SER
  - Documentation enhancements were made
  - Consistency added in the categorization determinations
  - Proceduralized guidance was enhanced
- These enhancements were done under the guidance of the Comprehensive Risk Management Program, and were approved by the Expert Panel prior to implementation

Process Enhancement Results

- STP completed a comparative evaluation of the categorization results for the EW and RA RSBDs since the implementation of the enhancements:

	Old Method	New Method
EW - High	6	48
Medium	91	120
Low	1260	195
NRS	49	1022

Process Enhancement Results

	Old Method	New Method
RA - High	0	0
Medium	0	0
Low	312	189
NRS	1510	1625

- The process enhancements have provided additional insight and documentation of the technical basis for component categorization - a safety positive result

OVERVIEW OF WORKING GROUP DETERMINATION OF RISK CATEORIZATION

Graded QA Working Group Membership

- Chairman-SRO
- Probabilistic Risk Assessment
- Operations-SRO
- Maintenance
- Facilitator
- Licensing
- Engineering
- Operating Experience Group
- Quality Assurance
- System Engineer for the system being reviewed

Working Group Meetings

- Working Group meets in three phases to risk rank systems
  - Phase 1-System Overview and Risk Ranking of System Level Functions
  - Phase 2-Risk Ranking of Components
  - Phase 3-Determination of Component Critical Attributes

Phase 1 Preparation for Working Group Meetings

- System review process includes all active components included in the Total Plant Numbering System (TPNS)
- System Engineer and Working Group Facilitator review system design documents
  - Design Basis Documents
  - Maintenance Rule Basis Documents
  - System Drawings

Phase 1 Preparation for Working Group Meetings continued

- System Engineer and Facilitator identify System Level Functions
- Working Group subject matter experts review functions and prepare draft answers for the 5 Critical Questions for each System Level Function
  - Subject Matter Experts consistent for reviews completed to date

Phase 1 Preparation for Working Group Meetings continued

- 5 Critical Questions for each Function
  - Initiating Events
  - Fails Risk Significant System
  - Accident/Transient Mitigation
  - Emergency Operating Procedure
  - Shutdown/Mode Change

Phase 1 Preparation for Working Group Meetings continued

- Questions Answered based on a rating scale of 0 to 5
- Questions answered based on:
  - Impact
  - Frequency
- Basis for response included in a Basis For Answers to Critical Questions section

Phase 1 Preparation for Working Group Meetings continued

- Weighting Factors are applied to numerical scores based on consequence importance
  - Accident/Transient 5
  - EOP 5
  - Fails Risk Significant Systems 4
  - Initiating Event 3
  - Shutdown/Mode Change 3

Phase 1 Preparation for Working Group Meetings continued

- Weighted score used to assign risk ranking
  - 0-20 NRS
  - 21-40 Low
  - 41-70 Medium
  - 71-100 High
- Answers to single questions can also set ranking
  - For example, a score of 5 for EOP's question automatically results in a High Risk Ranking

Phase 1 System Overview

- System Engineer presents overview of system including
  - System Function
  - System Reliability
  - Maintenance Rule Status
- PRA Representative present PRA overview of system including
  - Assumptions
  - Success Criteria
  - Assumed Operator Functions

Phase 1 System Overview cont.

- Other Working Group Members present overview of system for the following areas:
  - Licensing
  - Quality Assurance
  - Operating Experience
  - Operations

Phase 1 System Level Function Ranking

- Working Group collectively reviews answers to the 5 Critical Questions prepared by the Subject Matter Experts
- Working Group reviews scores assigned to each of the 5 Critical Questions
- Working Groups discusses other deterministic insights to support risk ranking

Phase 1 System Level Function Ranking cont.

- Working Group reaches consensus on final weighted numerical rating for system level function
- Working Group reviews the proposed risk ranking for the system level functions
- Working Group approves risk ranking for each system level function
- Final risk ranking can not be lower than PRA ranking, but may be higher

Phase 2 Component Risk Ranking

- System Engineer and Facilitator prepares draft matrix to map components to System Level Functions
- Initial Risk Ranking for components is the highest risk ranking for System Level Functions supported by that component
- Working Group reviews and approves map of components compared to System Functions

Phase 2 Component Risk Ranking cont.

- Component risk ranking evaluated for adjustments based on:
- General/Generic Notes
    - Vent and Drain Valves
    - Handswitches
    - Instrument Indications
    - Locked Open Valves

Phase 2 Component Risk Ranking cont

- Other Working Group insights
  - Component design
  - System redundancy
  - Diversity of backup components
  - Reliability of component
- Working Group approves final component risk ranking

Phase 2 Component Risk Ranking cont.

- Approved adjustments to risk ranking are documented in Additional Deterministic Insights column or in General Notes
- For PRA ranked components, risk ranking can not be lower than PRA ranking, but may be higher
- Dissenting Opinions are documented for presentation to the Expert Panel

Phase 3-Determination of Component Critical Attributes

- Critical Attributes are those attributes of a component that must occur to support risk significant system level functions
- Working Group specifies Critical Attributes for the following components:
  - All attributes for Safety Related **High** components are assumed to be critical and are not specifically documented
  - Critical Attributes are documented for Safety Related **Medium** and **Low** components and for Non-safety related **High** and **Medium** components

Risk Significance Basis Document

- Risk Significance Basis Document contains:
  - Background information used by Working Group members to review system functions and components
  - PRA Data for system
  - System Health Reports
  - System Functions Risk Ranking
  - Matrix showing System Function and Component relationships

Risk Significance Basis Document

- Risk Significance Basis Document contains (cont.):
  - Component Risk Ranking
    - Component Risk Ranking include answers to the 5 Critical Questions and numerical score for each question derived from the risk ranking process
  - Critical Attributes for applicable components
  - Summary of Grading Results
- Serves as Basis Document for Risk Ranking of each system reviewed by GQA Working Group

Comprehensive Risk Management Expert Panel

- CRM Expert Panel provides overall guidance to CRM process at STPNOC
- Approves processes used by Working Group to risk rank systems and components
- Hears presentation of Risk Significance Basis Documents
- Resolves dissenting opinions
- Ensures the technical adequacy of Basis Documents presented for approval

Comprehensive Risk Management Expert Panel

- Approves Risk Significance Basis Documents
- Approves posting of component rankings in the Master Equipment Database
- Approves revisions to Risk Significance Basis Documents, if revised by the Working Group

Six Month Review of Risk Rankings (Feedback Process)

- Working Group reviews all risk ranked systems every 6 months to determine if changes in risk rankings are needed
- Areas for review include changes in:
  - Equipment Performance
  - Design Modifications
  - Maintenance or Operations Activities
  - PRA Model
  - Quality Requirements

Results of Reviews To Date

- 21 Risk Significance Basis Documents Approved
  - Covering 29 systems
  - 22,380 components per unit were ranked
  - 15,010 were ranked same as system level function
  - 85 were ranked higher than system level function
  - 7,285 were ranked lower than system level function

Results of Reviews To Date cont.

- Comparison of Deterministic risk ranking versus PRA risk ranking
  - For PRA components:
  - 83% had **SAME** deterministic ranking as PRA
  - 10% had **HIGHER** deterministic ranking than PRA with final ranking based on deterministic rank
  - 7% had **LOWER** deterministic ranking than PRA with final ranking based on **PRA ranking**

Results of Reviews To Date cont.

- Two rounds of 6 Month Reviews have been completed
  - Steam Generator Power Operated Relief Valve hydraulic accumulator high pressure switch raised from **LOW to MEDIUM** based on poor reliability

Future Improvements

- Evaluating deletion of numerical ranking and answers to 5 Critical Questions for component risk ranking
  - Does not add value to process
  - Source of potential errors
  - Will reference reason for any deviation from system level function risk ranking using general notes or component specific insights

Future Improvements continued

- Working Group will develop standardized General/Generic Notes that will be used on all Risk Significance Basis Documents to provide consistent basis for component risk ranking
- Evaluating methods to develop definitions for deterministic terms used to answer Critical Questions
- Governing procedures will be revised to document changes to process

Future Improvements continued

- Will complete statistical review of Risk Significance Basis Documents to ensure all components rated lower than most limiting from System Function risk ranking are properly documented. Will upgrade documentation, as needed
- Evaluating improvements in efficiency of the 6 month review process based on lessons learned from reviews performed to date

Process Summarization

- The categorization process is a living process, and will continue to evolve as lessons learned and new insights are applied
- STP believes that the categorization process in use is robust, that it provides a strong technical basis for component categorizations, and it strongly supports the intent of Option 2
- NRC insights provided during the collaborative phone calls have been value-added in strengthening the NRC's knowledge of the process and in enhancing the STP process

Process Summarization

- The insights gained from the component categorization process can be applied to more than Quality Assurance
- Finally, STP is committed to a risk-informed future, and looks forward to both the safety benefits and process efficiencies that will result.
-

10. *The licensee is proposing to downgrade the manual initiation of protective functions one lower level than the ranking of the controlled component. This will result in manual initiation functions being downgraded to LSS when the controlled component is categorized MSS and, thus, manual initiation will be exempted from the special treatments. However, manual initiation is required by IEEE-279 which is embedded in 10 CFR 50.55a(h).*

    (a) Therefore, explain why an exemption from 10 CFR 50.55a(h) has not been requested.

    (b) If such an exemption request is proposed, provide the technical basis for the request.

RESPONSE (part a): (R. Chackal)

We agree with the NRC feedback. Sections 4.3 and 4.4 of IEEE Standard 279 do reference quality and environmental qualification requirements for protection systems and do not exclude the manual initiation portion of those systems from these requirements. Therefore, STP will request an exemption from 10CFR50.55a(h) with respect to sections 4.3 and 4.4 of IEEE 279 in order to allow exemption of LSS and NRS components from these special treatment requirements. STP would continue to meet the other requirements listed in IEEE 279, including functional and design requirements.

RESPONSE (part b): (R. Chackal)

Manual initiation components included in the scope of IEEE 279 that have been risk ranked by STP consist of handswitches. STP is using the convention of risk ranking control room handswitches one level lower than the controlled component, except that if the controlled component is LSS, the handswitch must also be LSS. Under this convention, handswitches used for the manual initiation of protective systems could be ranked LSS if the controlled component is MSS. These handswitches would be exempt from the special treatment requirements in IEEE 279. The technical basis for this is as follows:

1. The handswitches would continue to meet all other requirements of IEEE 279, including design requirements.

2. The experience of STP and the industry with handswitches has shown them to be very reliable. Comparisons of failure rates for safety related vs. non-safety related handswitches both at STP and in the industry have been performed. Results show that the failure frequency for non-safety related handswitches is no greater than that for safety related handswitches. Details on this review can be found at the end of the response to this question.

3. A handswitch is a typically rugged component that is unlikely to be affected by seismic conditions.

4. All of the handswitches within the scope of IEEE 279 are located in a mild environment and therefore would not be subject to specific environmental qualification requirements.

5. Protection systems are periodically tested. The scope of these tests includes the operation of these handswitches. If any malfunction occurred, it would be captured in the performance and feedback process and evaluated for impact on risk significance.

6. The primary method of actuating protective systems is through automatic means. Handswitches are provided only as backup. If both the automatic initiation and the main backup control room handswitch failed, redundancy would be available via redundant handswitches located in the control room, on the Auxiliary Shutdown Panel, or on transfer panels.

The STP convention for risk ranking handswitches is contained in a set of general notes that promote consistency in the risk ranking process for similar components. However, where appropriate, the Working Group can recommend and the Expert Panel can approve risk rankings that are more conservative than those provided for in the general notes. For example, in the Residual Heat Removal system, some control room handswitches were ranked the same as the controlled component due to their support of the manual start and/or alignment of the system.

Results Of Reviews To Compare Reliability Of Safety Related Versus Non-Safety Related Handswitches

STPNOC asserts that, for components within the scope of the STPEGS Graded QA Program, non-safety-related component failure rates are not appreciably greater than corresponding safety-related component failure rates for similar component types. To support this assertion, STPNOC has performed a detailed data analysis of Institute of Nuclear Power Operations (INPO) Equipment Performance and Information Exchange System (EPIX) data. Specifically, STPNOC has performed a data analysis for component type ID codes reported within the EPIX Nuclear Plant Reliability Data System (NPRDS) and the EPIX Maintenance Rule and Reliability Information (MRRI) database. Nuclear industry data reporting to NPRDS spans the time period from 1977 through 1996. The 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 STPNOC 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 to support responses for the STPEGS GQA RAIs. The scope of this merged NPRDS-MRRI analysis included consideration of over 670,000 component records and over 166,000 component failure records for those components. The historical data analyzed consisted of over 74 billion component-hours of experience. For RAI Item 10, this analysis included consideration of the circuit breaker (NPRDS/MRRI component ID code CKTBRK), which, for STPEGS, subsumes all safety-related and non-safety-related hand switches included in the NPRDS and MRRI databases. Analysis shows that the calculated safety-related CKTBRK failure frequency, 8.36E-07 functional failures per calendar hour, is actually greater than the non-safety-related CKTBRK failure frequency, 7.57E-07 functional failures per calendar hour, based on historical merged NPRDS-MRRI data. The relative difference between these two values is only 9.92%, well within the normal range factor (approximately 3) for this type of failure frequency parameter. For the CKTBRK component category, over 77,000 components were included in the data. A total of 9,501,464,064 (7,723,785,888 safety-related and 1,777,678,176 non-safety-related) component-hours of experience were analyzed. The results of this analysis have shown that, in general, nuclear power plant non-safety related equipment failure frequencies are no greater than or roughly equivalent to those for corresponding types of safety-related equipment.

15. *What is the mechanism and time frame to identify any changes in risk categorization of components from LSS/NRS to MSS or HSS that may be a result from operating experience or plant facility modifications? What is the time frame that these components will then return to the scope of the appropriate special treatment and how will a demonstration be made that shows the performance or condition of the components are being effectively controlled through the performance of appropriate special treatment?*

RESPONSE: (G. Schinzel)

The mechanism for identifying potential changes to component risk categorization resulting from both in-house and industry operating experience utilizes the Corrective Action Program (CAP) and the six-month review process. The Corrective Action Program is controlled by procedure 0PGP03-ZX-0002 and permits anyone at the plant site who identifies a deficiency to document that condition for correction. These documented deficiencies are available for review each day by Station personnel, and are acted upon to implement appropriate remedial and/or corrective actions. The six month review process is governed by procedure 0PGP02-ZA-0003, Comprehensive Risk Management.

On a once-per-six-month frequency, the Operating Experience Group performs a comprehensive evaluation of conditions generated within the previous six months against each specific risk-categorized system designator, and reports the results to the Working Group. This report includes information for the current reporting period, as well as the two previous reporting periods. The Working Group is tasked with determining if any risk categorization revisions are warranted based on:

- a degradation of equipment performance,
- System Engineer input, or
- Licensing, Quality, or Operations organization input.

Any proposed risk categorization changes are submitted to the Expert Panel for approval. Once approved, the risk categorization change is reflected electronically in the controlled Master Equipment Database and through a revision to the Risk Significance Basis Document for that system. In addition, if the risk categorization was changed from LSS/NRS to MSS or HSS, a new condition report would be generated to assess the impact of returning the subject component to the scope of the appropriate special treatments. This assessment would include an evaluation of activities performed on, with, or for the component during the time that the component was excluded from the scope of special treatment requirements. The condition report remains open until all corrective actions, if any, are implemented as appropriate. These corrective actions may include, but are not limited to, an evaluation of the component's impact on current operating conditions and the Technical Specifications. The component's performance would continue to be monitored as part of future six-month reviews to ensure that the applied controls are effective.

Potential risk categorization changes resulting from plant modifications are identified either during the development of the modification or during the periodic six-month review performed by the Working Group on the associated system. Currently, potential impacts to component categorization identified during the modification development phase are documented on a condition report and forwarded to the Working Group for evaluation. While the existing modification process procedure does not explicitly require an evaluation for risk categorization impacts, this procedure will be revised to include the requirement for an impact evaluation on system function/component risk categorizations when modifications are proposed. Any risk categorization changes resulting from plant modifications are implemented as described in the six-month review process discussed above.

It should also be noted that the above process does not preclude the Working Group from acting upon condition reports associated with potential risk categorization changes more frequently than every six months.

20. (a) *Explain how the common cause failure (CCF) basic event importance measure is estimated for the proposed exemptions. Explain the difference between the current method and the method reported in STP's graded quality assurance (GQA) program submittal dated August 4, 1997. Provide the basis for the new estimation method.*

RESPONSE: (A. Moldenhauer)

STP Nuclear Operating Company uses RISKMAN® to quantify the Probabilistic Risk Assessment (PRA) model. For each full scope model quantification used in the various sensitivity studies associated with the PRA risk categorization process, a basic event importance file is generated. A full scope model quantification for the STP PRA model is a Level 1 or 2 At-Power PRA quantification including external events, internal fires and internal floods. This information contains, among other parameters, Fussell-Vesely (FV) and Risk Achievement Worth (RAW) importance values for each basic event and common cause "event" or "term" in the model.

The previous methodology for determining the PRA component risk categorization as described in an RAI dated November 6, 1997 used the following process:

- the basic event importance files were generated from each RISKMAN® sensitivity study, and
- the basic event importance measures were "rolled up" into component importance measures.

The "roll up" is accomplished as follows:

- The component FV importance is calculated as the sum of the basic event and associated common cause term FV importance values.
- The component RAW is calculated as follows:

$$RAW_{comp} = 1 + \sum_{i=1}^{n}(RAW_i - 1)$$

Where, RAW_i is the RAW value of a basic event and/or common cause term associated with the component of interest, and RAW_{comp} is the combined RAW value for the component as a whole, including all associated common cause failure term impacts.

The important issue here was including the complete common cause term importance value for each and every associated component in a common cause group. This approach is extremely conservative and greatly over-estimates the importance based on double counting the common cause terms.

For example, consider a common cause group which is represented by three similar components, (e.g., pumps) in a symmetrical functional alignment at the plant. If system success criteria requires two of three trains of the system to be successful, and the independent basic event failure modes for the three components are represented by A, B, and C, then the minimal cut sets for this function can be represented as follows: AB, BC, AC, [AB], [BC], [AC], and [ABC] where the terms in brackets represent common cause failure terms. The previous method for "rolling up" the importance's of these terms to their respective components includes the importance terms for each of the following:

- Component A: A, [AB], [AC] and [ABC].
- Component B: B, [AB], [BC] and [ABC].
- Component C: C, [AC], [BC] and [ABC].

As can be seen in this example elements of [AB], [BC], [AC] and [ABC] are counted more than once which results in an overly conservative estimate.

Thus, over counting of the doublet and triplet importance terms occurs in the overall computation of component importance measures. When more than three terms are included in a common cause group cut set, this multiple counting of the importance is further exacerbated (i.e., quadruple counting of four term common cause events, quintuple counting of five term common cause events, and so on). In reality, the common cause failure terms or cut sets are separate events in the risk model, and therefore, it is difficult to define how the importance of these dependent events should be accounted for in individual component risk categorization processes. However, it is evident that multiple counting of the importances from these events common cause is overly conservative.

In order to eliminate some of the conservatism associated with the above process, STP now splits the importance of multiple term common cause failure events evenly among their constituent components. For example, considering the case above with a common cause group with three similar components, an individual component, A, importance includes the whole contribution of the independent failure and partial contribution of the common cause event. Mathematically, the Fussell-Vesely importance for component A is represented by:

$$FV_{Comp\ A} = FV_A + 1/2{*}FV_{[AB]} + 1/2{*}FV_{[AC]} + 1/3{*}FV_{[ABC]}$$

Where, $FV_{Comp\ A}$ represent the total FV importance of component A, $FV_{[AB]}$ represents the FV importance of the common cause event between component A and component B, and
$FV_{[ABC]}$ represents the FV importance of the common cause event between components A, B and C.

The common cause event term (e.g., $FV_{[AB]}$) is multiplied by 1/3 to prevent triple counting. The generic equation for determining the FV component importance associated common cause events is:

$$FV_{Comp\ x} = FV_x + 1/2{*}FV_{Doublet} + 1/3{*}FV_{Triplet} + 1/4{*}FV_{Quadruplet} + \cdots$$

Where, $FV_{Comp\ x}$ represents the total FV importance of component x.

STP has also performed a sensitivity study to determine the impact of the previous overly conservative method of including the double, triple and even quadruple counting of common cause. The following table represents the results of PRA rank categorization:

Category	No. of Changes
Medium-R to High	26
Medium to Medium-R	0
Low to High	0
Low to Medium	20
No change	1068
Total	1114
Note: Medium-R represents components with RAW values between 10 and 100, and No components decreased in rank.	

The following table represents the component type associated with those components that did change ranks:

Component Type	No. of Components
Circuit Breakers	3
Dampers	6
Valves	37

The above 46 components are encompassed by 7 systems. These system are:

System Designator	System Description	# of Components
CC	Component Cooling Water	6
DG	Standby Diesel Generator	3
HE	Electrical Auxiliary Bldg HVAC	6
MS	Main Steam*	20
PK	4kV AC Class 1E Power	3
RH	Residual Heat Removal*	6
SI	Safety Injections*	2
*Ranking results from this sensitivity study equate to the final ranking.		

Using the approach from the previous overly conservative methodology would result in the re-categorization of only 15 components in the Component Cooling Water, Standby Diesel Generator, and Electrical Auxiliary Bldg HVAC systems. The final risk categorization from the three of the other four systems (MS, RH and SI) would have no impact since the components in these system are already deterministically evaluated to be equivalent to the sensitivity study results. The 4kV AC Class 1E Power system has not yet been evaluated by the risk ranking process.

There are two main advantages in using the current approach. First, each component's importance measure includes contributions from independent failures and common cause events with respect to both accident/transient initiation and mitigation. Second, the importance of an individual component is not overstated and more realistically represents the true importance to the overall plant. The current methodology has evolved since 1997 in order to remove of some of the conservatism associated with the previous approach.

20. (b) In Section 5.2.4.1 of the submittal, it is indicated that the same PRA tools used for the GQA program will be used for the proposed exemption. In addition to the method of estimating CCF, identify other changes made, if any, to the categorization process since the GQA submittal was approved on November 6, 1997.

RESPONSE: (A. Moldenhauer)

As outlined in the response to part (a), the method for PRA risk categorization has evolved to more accurately reflect a component's true importance with respect to common cause factors, accident initiation, and mitigation. Another change in the risk categorization process, as outlined in the SER (*Graded Quality Assurance, Operations Quality Assurance Plan (Revision 13), South Texas Project, Units 1 and 2 (STP)(TAC Nos. M92450 and M92451)*, November 6, 1997), is a process outlined in section 3.2.3, Qualitative Categorization Methodology. The first sentence in the second paragraph states:

> "To expand the categorization to SSCs not modeled in the PRA (and accept the appropriateness of reduced QA controls on safety-related MSS-2 and LSS SSCs modeled in the PRA), the WG identifies and documents every component attribute which supports any HSS system function."

STP identifies all attributes for HSS safety related components, which are considered critical attributes. For MSS and LSS safety related components, only the critical attributes are identified and documented. For non-safety related components only the HSS and MSS components have critical attributes identified and documented. However, STP does not identify and document every component attribute that supports any HSS system function as stated in the GQA SER.

The final change in the risk categorization process is associated with determining the importance of system functions. See the response to question 31 for more details on this change.

21. Regulatory Guide 1.174 states that "all safety impacts of the proposed change are [to be] evaluated in an integrated manner as part of an overall risk management approach in which the licensee is using risk analysis..."

(a) Provide a discussion on the aggregate impact of the proposed exemptions on plant risk in terms of CDF and LERF.

In Section 5.2.4.1, pages 16 and 17 of the submittal, it is stated that "STP performed sensitivity studies in which unreliability was simultaneously increased for medium safety significant and low safety significant SSCs of a similar type within the scope of the PRA. These studies evaluated the impact of increasing the unreliability of the group of SSCs by as much as an order of magnitude. Based upon these studies, STP determined that increases in the failure rate by as much as an order of magnitude had little, or no, impact on the final SSC risk categorization."

RESPONSE: (D. W. Stillwell)

All equipment necessary to mitigate the consequences of initiating events are included in the plant PRA. Changes to the risk significance of components included in the PRA will not result in removal of the equipment from the model. As the Graded QA process is fully implemented, changes in equipment failure rates, if they occur, will be identified by the Maintenance Rule Program or the Corrective Action Program and the new failure rates incorporated into the PRA model during the cycle updates. Requantification of the model with the changed failure rates may result in a change to the components risk ranking. However, based on evidence being collected to support the Balance of Plant model, the failure rates for most equipment whose QA requirements are relaxed will not change significantly.

Therefore, we expect no impact on plant risk in terms of core damage frequency or large early release frequency. Notwithstanding this conclusion, use of the special treatment exemption, when granted, will occur only as components are replaced. Any change to core damage frequency or large early release frequency is expected to be gradual and detectable before a significant impact to core damage frequency of large early release frequency occurs.

21. (b) Provide the details and the results of the sensitivity analyses. It is unclear to us whether unreliability of all groups of SSCs were increased by an order of magnitude. If you assumed that the increase in unreliability is varied for different groups of SSCs, explain the basis of your assumption.

RESPONSE: (D. W. Stillwell)

Only the failure rate for check valves was modified as a sensitivity case. Check valves were selected on the basis that most of the valves would have a low ranking in the PRA. Another factor was that check valves experience both a passive (transfer close/open) and active failure (fail to open/close on demand) mode. Check valves in general have low failure rates which is ideal for changing the failure frequency by factors of 2, 5 and 10. The details of these sensitivity studies are presented below.

Additional sensitivity studies on other equipment groups have been performed for other plant applications. Analyses have been completed for solid state protection system relays that investigated the effects of increasing failure rates by factors of ten and one hundred. No significant change in core damage frequency was seen with an increase in relay failure rates of one hundred, primarily due to the two-out-of-four relay logic.

21. (c) Identify the "types" of SSC selected, and define how a "group" was chosen.

RESPONSE: (D. W. Stillwell)

Check valves were the only group selected for this sensitivity case study. The failure rates for both passive and active failure modes were changed at the same time.

21. (d) Explain why you only increased the failure rates one group at a time. Discuss if any of these studies lead to any changes in the categorization.

RESPONSE: (D. W. Stillwell)

For the only group, check valves, the component failure rates for both passive and active failure modes were increased by a factor of 2, 5 and 10. There was only one component that changed categories from low to medium. This component was just inside the low ranking boundaries and changed to medium ranking when the failure rate was increased by a factor of 10. However, the composite rank for the check valve in question was already ranked medium due to the importance of the valve during several planned maintenance evolutions. Therefore, this sensitivity study, in of itself, did not impact the overall risk ranking for the check valves.

21. (e) Discuss how these sensitivity studies account for potential common mode failure in diverse and redundant systems under postulated accident conditions.

RESPONSE: (D. W. Stillwell)

Common cause failure in redundant systems (e.g. ECW, CCW, etc.) is explicitly modeled in the RISKMAN systems analyses for all active components within a system. Any change in the underlying basic event probability of failure is automatically carried through the quantification of the system. Other causes of common mode failure, such as single point failure (tanks, etc.) external effects (fires, floods, etc.) are also explicitly considered in the system and event tree models. Any increase in the underlying failure rate will be included in the quantification.

Potential common mode failures in diverse systems are explicitly modeled in the RISKMAN system models for some basic events such as 4kV breakers. For these components any increase in the basic failure rate data will be quantified as described above. For other types of equipment, such as MOVs, potential changes in the underlying basic event failure data are not carried across diverse systems. This is because of the unique operating conditions for the diverse systems.

22. *During the review of the Safety Injection (SI) system at STP, the staff noted that the system binder contained a general note allowing the limit switches which are used in actuation of critical components to be rated as LSS. However, upon inquiry from the NRC staff, the licensee stated that this note has been revised by a new note and the new note does not generalize the categorization of limit switches used for actuation of other components. Upon review of the SI system binder, it was determined that the SI system review was done based on the original note in the binder and was not based on the revised note.*

    (a) *Describe the general quality assurance program that is being or will be applied by STPNOC, and what corrective actions are being taken, on its risk categorization process to avoid these types of errors.*

    (b) *The staff also requests that the licensee justify this discrepancy not only for the SI system, but for all other systems where the old note has been listed in the system binder.*

    (c) *Also, the licensee should provide assurance that any other general note which has been revised such that it can affect the categorization of components, has been evaluated for the affected systems and the categorization of the components has been corrected if needed.*

RESPONSE (part a): (R. Chackal)

The provisions of the Operations Quality Assurance Plan (OQAP), Chapter 15.0, Quality Oversight Activities, govern the oversight of the risk categorization process. The program implemented by Chapter 15 provides for independent oversight activities (including audits, assessments, evaluations, performance monitoring, and surveillances) to ensure that the requirements of the Operations Quality Assurance Program are being properly implemented.

STP has performed a focused assessment on application of General Notes affecting limit switches. In addition, STP will perform a broader review of all General Notes to ensure consistency and appropriateness in the application of the General Notes. Procedural guidance will also be added to 0PEP02-ZA-0001, Graded Quality Assurance Process, to clarify control, use, and revision of General Notes in the risk categorization process.

As detailed in the additional responses that follow, a condition report has been initiated to specifically re-evaluate limit switches that support actuation of risk significant components. The Corrective Action Program (CAP) supports the implementation of the OQAP, Chapter 13.0, Control of Conditions Adverse to Quality. This process requires that conditions be evaluated and resolved, that generic implications be addressed, and that actions to prevent recurrence are implemented, as appropriate.

RESPONSE (part b): (R. Chackal)

As with the risk categorization methodology, the development of the existing set of General Notes was an evolutionary process. Initially, STP used General Notes as a means to more efficiently document the risk bases for large numbers of similar components, such as vent and drain valves and indication-only instruments. General Notes were developed each time a new system was evaluated for risk categorization, and the developed General Notes were specific to that system.

Over time, it became apparent that improved consistency, justification, and efficiency could be obtained if one set of General Notes applicable to all systems was developed. This set of "Generic Notes" was specifically approved by the Expert Panel, and use of Generic Notes began in mid-1999. The Safety Injection system was one of the last systems to utilize the old-format notes.

RESPONSE (part c): (R. Chackal)

As stated, STP has reviewed all evaluated systems that utilized the old-format notes to ensure consistency with the approved General Notes. Specific for the categorization of limit switches, none of the other systems' notes made reference to limit switches except for the Fuel Handling Building HVAC (HF) system,. For the HF system, the limit switch note references indication-only switches. This General Note specifically excluded switches involved in the actuation of components.

STP has evaluated the noted discrepancy on the Safety Injection (SI) limit switches involved in the actuation of critical components. STP concludes that these switches should receive the same risk rank as their associated component, if their failure could prevent the actuation of that component. We have initiated a condition report to effect this change, to review all previously evaluated systems for this occurrence, and to revise the generic notes to specifically refer to this determination.

Recognizing that the Risk Significance Basis Document (RSBD) is a "living" document, STP had, prior to identification of this discrepancy, initiated a mechanism for identifying and capturing needed changes to the RSBDs, utilizing the Corrective Action Program. As part of this program, STP intends to revise the affected RSBDs to reflect the current generic notes, among other updates, during the 6-month review process. The revision process will ensure that the risk categorization of previously evaluated components is consistent with the system's revised set of general notes, and, if not, that the risk rank is revised as needed or appropriate justification is provided.

23. *During the August 31, 1999, meeting, the licensee informed the staff that certain electrical components may continue to be classified as HSS or MSS, while the attached mechanical components are classified as LSS or NRS. Also, during the same meeting, the licensee informed the staff that components which perform a support function for HSS and MSS systems or components, will have the same HSS or MSS classification as the supported systems or components. Therefore, please describe:*

    (a) *The process criteria or rules for classifying inter-connected and supporting components (e.g., electro-mechanical components, supporting systems or components) including consideration of functional dependencies, and*

    (b) *The process criteria that will be implemented to ensure that HSS or MSS electrical components will remain functional including consideration of potential adverse spatial interactions between mechanical and electrical components.*

RESPONSE (part a):

The process for classifying interconnected and supporting components centers on the impact and probability of failure on the primary component. For a typical electro-mechanical device, the mechanical component is tasked with supporting one or more system functions and the associated electrical component provides the motive power to the mechanical component. For example, a motor operated valve may be ranked as MSS because its failure to change state would fail a system function ranked MSS. The motor operator would then be ranked MSS because its failure would prevent the valve from changing state and would therefore fail the MSS function. Another example illustrates differences in risk between interconnected components. A pump may support two system functions. The first function, which is ranked LSS, is to move fluid through that part of the system. The second function is pressure boundary, which is ranked MSS. The pump is therefore ranked MSS because one of its failure mechanisms (loss of pressure boundary) would fail the MSS function. The pump motor, on the other hand, is ranked LSS because its failure would prevent the pump from moving fluid but would not affect its pressure boundary integrity. Thus, only the LSS function would be impacted.

The inference that certain electrical components may continue to be classified as HSS or MSS, while the attached mechanical components are classified as LSS or NRS is not consistent with the typical electro-mechanical device where the electrical component supports its associated mechanical counterpart. An atypical example would be a diesel generator where the engine is the support component for the generator. As highlighted above, the risk ranking process treats interconnected components by evaluating the impact of the failure of the support component on the associated primary component. The support component could not be ranked higher than the primary component, unless the former also supported another higher ranked primary component or function, which would be highly unlikely.

RESPONSE (part b):

As noted above, electrical components typically provide a support function to and would not be ranked higher than the attached mechanical counterparts. For HSS and MSS electrical components, the associated mechanical components would therefore have also been ranked as HSS or MSS. This would exclude these mechanical and electrical components from the scope of this exemption request and no change in spatial interaction considerations would be introduced.

26. *Please provide an explanation about how the safety-significance determination process was applied to the auxiliary feedwater system (AFWS) steam supply orifices for the AFWS pump turbine. How did the determination process account for the design modification which had replaced steam condensate traps with orifices as a result of operational problems (turbine overspeed had apparently resulted from the presence of steam condensate in the AFWS pump turbine steam supply when the steam condensate traps had overfilled)?*

RESPONSE: (R. Chackal)

The risk significance determination process included specific discussion on the design modification that replaced the steam condensate traps with orifices. The system engineer provided the Working Group with information on the modification to help the members understand the basis and scope of the modification. The Working Group then utilized this knowledge in reaching consensus on the risk of the condensate removal function and its supporting components.

STP verified through operational experience that large amounts of condensate buildup in the main steam supply line to the Terry Turbine can lead to an overspeed when the turbine is started. Therefore, the automatic start function of the Terry Turbine, a component risk ranked as High, is dependent on effective moisture removal from the steam supply system. For this reason, the condensate removal function was ranked High by the Working Group.

The components involved with detecting and alarming excessive moisture buildup in the steam lines were ranked Medium. This was based on the fact that there are multiple and independent means to detect and alarm moisture buildup.

The orifices, which replaced the steam traps, support the condensate removal function. These components were ranked Low based on the following:

1. An orifice is inherently a very reliable device, as it has no moving parts.

2. The primary failure mechanism attributable to the orifice itself is erosion. Erosion would increase the amount of condensate removed. Therefore, failure would be in a conservative direction.

3. There are multiple lines and orifices installed such that failure of any one line or orifice would not impact the condensate removal function.

Given the intrinsically fail-safe characteristic of orifices and the redundancy of the multiple means for condensate removal, moisture detection, and alarms described above, it has been determined that the possibility of an orifice failure leading to a turbine overspeed trip is extremely low.

Additionally, the critical attribute of "allow condensate to drain" is specified for these orifices. STP's process provides for special considerations when plant activities, such as maintenance or procurement, may affect the critical attribute(s). Increased controls and documentation are required for such activities. For example, maintenance work on the orifice would include appropriate controls to ensure that the ability of the orifice to properly drain condensate has not been negatively affected when the component is returned to service.

27. During the staff's recent visit to the STP plant site, a sample comparison was completed for risk rankings in the risk-significance basis documents for two heating, ventilation and air conditioning (HVAC) systems. These systems included the electrical auxiliary building (EAB) HVAC and fuel handling building (FHB) HVAC.

A sample comparison of risk rankings for fire dampers for the EAB HVAC and FHB HVAC systems, respectively, showed that EAB HVAC system dampers were assigned a risk ranking of "Medium" while FHB HVAC system dampers were assigned a risk ranking of "Low." Provide the bases for the differences in risk rankings. [The licensee has frequently cited fire dampers as an example of components brought into scope to receive "special treatment."]

Compare the risk rankings of the filtration fans, HEPA filter and carbon filter in both the EAB HVAC and FHB HVAC systems (i.e., a comparison of components that are typically covered by Technical Specifications) and provide the bases for any differences. Select two other examples where the risk rankings differ and provide the bases for the differences.

RESPONSE:

The EAB HVAC (HE) system fire dampers were ranked MEDIUM due to the potential consequences of the spread of fire resulting from a failed fire damper being more severe in this system than they are in the Fuel Handling Building HVAC (HF) system. In the HE system, it could not be assured that failure of a fire damper in one train would not prevent the fire from spreading to another train (another risk significant area). The design of the HF system is different than the HE system in that the functions with the highest risk (MEDIUM) are associated with providing cooling air to essentially self-contained rooms such as the Safety Injection (SI) and Containment Spray (CS) pump rooms. In addition, there are 3-hour rated fire barriers (walls) between the three trains of SI/CS pump rooms. The rest of the system, including the supply and exhaust of air to/from the Fuel Handling Building is categorized LOW or NRS. Thus, failure of a fire damper in one area of the HF system would not be assumed to result in the spread of fire to another area categorized as MEDIUM.

In addition, the number and percentage of HE components ranked HIGH/MEDIUM far exceed those for the HF system, as shown below:

Sys	High	Medium	Total (all risks)
HE	90 (4.7%)	92 (4.7%)	1,970
HF	0 (0%)	6 (0.8%)	755

A comparison of risk rankings between the two systems is provided in the following table for selected components.

Comparison of similar components between the HE and HF system produced the following results:

Type	PRA Risk		Determ. Risk		Final Risk		Basis	
	HE	HF	HE	HF	HE	HF	HE	HF
FAN	High	N/A	Med.	Low	High	Low	Deterministic risk based on component's support of system functions ranked Medium, including the smoke purge function. PRA risk based on high Risk Achievement Worth (RAW) and/or Fussell-Vesely (FV) values. Refer to PRA analysis for further details. Final risk is highest of PRA or deterministic.	Deterministic risk based on component's support of functions ranked Low, including exhausting Fuel Handling Building air to the main vent stack. The PRA does not rank this component as it falls below its threshold for Low risk.
HEPA Filter	Med.*	N/A	Med.	Low	Med.	Low	Deterministic risk based on component's impact on system functions ranked Medium, including the potential to impede cooling airflow if the filter is clogged. PRA risk based on similar considerations, resulting in relatively high RAW values (100.0 > RAW ^{3} 10.0). Note: the asterisk in the PRA risk indicates that the Full QA program is to be applied to those critical attributes of the component that are associated with the RAW value.	Deterministic risk based on component's support of functions ranked Low, including the filtering of exhaust air to remove radioactive particulate. The PRA does not rank this component as it falls below its threshold for Low risk.
Carbon Filter	N/A	N/A	Low	Low	Low	Low	Component supports system function to remove airborne radioactivity. Function is ranked Medium and component is deterministically ranked Low based on redundancy. The PRA does not rank this component as it falls below its threshold for Low risk.	Deterministic risk based on component's support of functions ranked Low, including filtering of exhaust air to remove radioactive iodine. The PRA does not rank this component as it falls below its threshold for Low risk.
Heater	N/A	N/A	Med.	Low	Med.	Low	3V111VHX012, C Train Battery Room Reheat Coil - Deterministic risk based on component's impact on system functions ranked Medium, including the function to maintain room temperatures within the design range (areas containing risk significant equipment). The PRA does not rank this component as it falls below its threshold for Low risk. This heater is required to remain operational during a LOOP.	3V121VHX007C, Fuel Handling Building Exhaust Filtration Unit Heater 13a - Deterministic risk based on component's support of functions ranked Low including the function to provide heating of the exhaust air to reduce moisture which could impact the carbon filters. The PRA does not rank this component as it falls below its threshold for Low risk.

Backdraft Damper	High	N/A	Med.	Low	High	Low	3V111VDA224, EAB Main Air Handling Unit 11a Outlet Backdraft Damper – Deterministic risk based on component's impact on system functions ranked Medium, including the function to maintain room temperatures within the design range (areas containing risk significant equipment). PRA risk based on high Risk Achievement Worth (RAW) and/or Fussell-Vesely (FV) values. Refer to PRA analysis for further details. Final risk is highest of PRA or deterministic.	3V121VDA151, FHB Main Exhaust Fan 11a Discharge Backdraft Damper - Deterministic risk based on component's impact on system functions ranked Low, including the function to exhaust FHB air to the main vent stack under accident conditions. The PRA does not rank this component as it falls below its threshold for Low risk.

As a result of telephone conversations between the NRC and STP on specific components in the HE system, it was noted that some of the answers to the critical questions at the component level are not fully consistent with the final risk categorization assigned to the components or the supported functions. STP considers the final risk assigned to the system functions and components to be correct, and attributes the identified discrepancies to administrative documentation errors. STP has initiated a condition report to document this discrepancy and to implement corrective action. As part of this corrective action, STP is re-assessing the use of the critical questions at the component level since experience has shown that there is little associated value. In addition, STP has identified a focused group of components (about 5% of the total components risk categorized to date) that will be specifically reviewed for adequacy of documentation. Additional documentation sampling of other risk categorized components will occur to fully assess the overall documentation adequacy.

28. *Please describe how the licensee's risk determination process evaluates the significance of all areas covered by the Maintenance Rule scope (50.65(b)(1), (b)(2)(i), (b)(2)(ii), and (b)(2)(iii), and associated industry guidance). If the risk determination process does not cover the Maintenance Rule scope, provide appropriate justification as the staff will need to fully understand and evaluate the differences.*

RESPONSE: (R. Chackal)

The risk significance determination process encompasses all structures, systems, and components (SSCs) covered by the Maintenance Rule scope as described in the referenced regulations and associated industry guidance. For each system that is reviewed under this process, all "tagged" components (refer to RAI question no. 1 response for additional discussion), whether safety related or non safety-related, are categorized via the risk significance determination process. Any SSC that has not yet been risk categorized (i.e., a component in a system that has not yet been reviewed) will not be subject to relaxation of applicable special treatment requirements until such time that the risk categorization is performed.

The risk significance determination process is detailed in STPNOC procedures 0PGP02-ZA-0003, Comprehensive Risk Management, and 0PEP02-ZA-0001, Graded Quality Assurance Working Group Process. Generally, the process consists of blending the PRA risk for a component with a deterministic evaluation to reach an overall risk significance categorization. The deterministic evaluation consists of answering a set of five critical questions similar to those identified in the referenced regulation. The answers to these questions are weighted to provide an appropriate degree of significance, depending upon the importance of each question. In order to provide a consistent and robust approach, the system functions are first risk categorized through this process, followed by the relationship identification between each component and the system function(s) it supports, and finally, by the risk categorization of the component itself. Additional details can be found in the above referenced procedures and in other responses elsewhere in this RAI. The table on the following page provides a comparison between the Maintenance Rule scope and the scope of the Risk Significance Determination Process.

Based on the above, STP's position is that the risk significance determination process fully covers, and in fact exceeds, the scope of the Maintenance rule.

MAINT. RULE SCOPE	EQUIVALENT SCOPE IN RISK SIGNIFICANCE DETERMINATION PROCESS	COMMENTS
50.65(b)(1) – safety related structures, systems, and components (SSCs)	Safety related SSCs that are "tagged"; i.e., that are part of the Total Plant Numbering System (TPNS)	Any safety related SSCs that are not evaluated by the Risk Significance Determination Process remain conservatively under the "Full" QA program and are excluded from the scope of this exemption request
50.65(b)(2) – Only those non-safety related SSCs that: (see list below)	All non-safety related SSCs that are tagged	Any non-safety related SSCs that are not evaluated by the Risk Significance Determination Process are excluded from the scope of this exemption request
(b)(2)(i) – are relied upon to mitigate accidents or transients or are used in Emergency Operating Procedures (EOPs)	The following questions are evaluated to determine the risk significance of SSCs: - Used to mitigate accidents or transients? - Used in EOPs or in Emergency Response Procedures?	

(b)(2)(ii) – whose failure could prevent SSCs from fulfilling their safety related function	The following question is evaluated: - Could fail a risk significant system?	
(b)(2)(iii) – whose failure could cause a reactor scram or actuation of a safety related system	The following question is evaluated: - Could directly cause or has caused an initiating event?	An initiating event is an occurrence that causes a challenge to the plant. There are approximately 50 categories of initiating events, ranging from Loss of Offsite Power to Loss of Instrument Air
	The following additional question is evaluated: - Is it safety significant during shutdown or mode change operations?	

30. *Explain the categorization scheme for risk ranking SSCs not in the licensee's PRA and for system functions. Provide the basis for the 6-point (0 to 5) rating scale used by the plant's Working Group to risk-rank SSCs. For example, explain how "insignificant" impact is different from "minor" impact in discriminating the two points on the scale. Other examples include: "minor" impact and "low" impact, "rarely" occurring event and "infrequently" occurring event, "infrequently" occurring event and "occasionally" occurring event, "regularly" occurring event and "frequently" occurring event. Unless there is an underlying basis associated with these words to meaningfully differentiate the adjacent points on the scale, we find that some of the adjacent points on the proposed scale do not convey any intrinsically meaningful difference. If, for example, a smaller scale, i.e., 3-point scale, is used to clearly distinguish the points in the scale, discuss how such a scale might impact the risk-ranking results. In other words, provide a discussion of how a robustness of a scale affects the sensitivity of the risk-ranking results. Include in the discussion the basis of the weighting factors (and the associated numerical values) and their impact on the risk-ranking. Also include the basis for the "score ranges" for final risk ranking categorization.*

RESPONSE: (G. Schinzel)

The referenced rating scale is used in the deterministic input to the risk categorization process for both PRA-modeled and non-modeled components. Deterministic input is defined in procedure 0PEP02-ZA-0001, Graded Quality Assurance Process, as:

> "An assessment of risk significance based on the collective input from a panel of individuals experienced with the pertinent aspects of managing and operating a nuclear generating facility (e.g., operations, maintenance, design, engineering, and risk analysis). Deterministic input is used to supplement PRA risk rankings, and/or to compensate for PRA limitations and assumptions. Deterministic input is also used for components not modeled in the PRA."

The GQA Working Group membership, as defined in procedure 0PGP02-ZA-0003, Comprehensive Risk Management, is made up of experienced personnel with diverse knowledge and backgrounds. In order to provide the Working Group members with a mechanism to collect and categorize their deterministic input in a consistent and documented manner, a set of five critical questions related to risk categorization are answered. Initially, during the development portion of the risk categorization process, these critical questions were just answered either "Yes" or "No". It quickly became evident, as experience was gained, that this method did not permit enough flexibility to adequately capture the risk insights and technical bases between various system functions or components. For example, the initiating event for loss of Essential Cooling Water has much more impact than the initiating event for loss of Instrument Air. Under the old method, both cases would only have answered "Yes" for the initiating event question, even though the risk significance impact would be quite different. Thus, the current rating scale was developed. With this scale, the Working Group has a consistent means to assign a positive response value that reflects the relative impact on the public health and safety resulting from the loss of a system function or component. By definition, the deterministic process is a subjective process based on the collective wisdom and experience of qualified individuals. The rating scale provides a consistent means to generate gradations in possible responses. The terminology used to define each gradation of the scale (having insignificant impact, minor impact, low impact, etc; or occurring very rarely, infrequently, occasionally, etc) serve as aids to the Working Group members in the selection of the proper scale value for each positive critical question response. While these terms (insignificant, minor, rarely, infrequently, etc) are not specifically defined, the terminology does provide adequate guidance to the Working Group members to arrive at consensus agreements in this subjective portion of the categorization process, and to document a technical basis for each response. As the positive response value increases through the scale from "1" through "5", it denotes progressive increases in risk significance impact, which is reflected in the proceduralized guidelines provided for using the rating scale. Usage of a smaller scale range would result in less flexibility and therefore less accuracy allowed to the Working Group in its deterministic assessment. Considering the wide variety of system functions and components, the present rating scale provides a good balance between providing enough flexibility in the risk categorization process and the complexity associated with varying degrees of responses.

Weighting factors are used to account for the relative impacts among the five critical questions. For example, the accident mitigation question is considered to have more risk significance impact than the initiating event question, assuming both were answered with the same positive response value. The Working Group determined that the five questions could be categorized into three weighting groups. In order to utilize a maximum overall score of "100", weighting factors of "3", "4", and "5" were used, as detailed in procedure 0PEP02-ZA-0001, Graded Quality Assurance Process. Thus, a maximum positive response of "5" to all five questions for a specific system function or component would result in a score of "100". The scale was then divided into four sections corresponding with the four risk significance categories. For conservatism, only the lower 40% of the scale was reserved for NRS/LSS components and the upper 60% for MSS/HSS components. In addition, special exceptions were incorporated into the process to account for a high positive response to any one question which might be masked by a low overall score due to low values for the other four questions. For example, a maximum value for "5" for initiating event would result in a minimum risk categorization of "MSS", even if all other questions were answered in the negative.

The Working Group developed the above process after extensive discussion. This proposed process was then presented to the Comprehensive Risk Management Expert Panel for approval prior to use. Use of the rating scale has provided risk significance categorizations that are consistent with both the Working Group members' overall sense and judgment and that of the Expert Panel members. It should also be noted that the rating scale is provided as a guideline and the Working Group and Expert Panel can and have deviated, in a conservative manner, from the guideline, based on special circumstances.

31. *(a) Explain the potential difference in the importance of an SSC for at-power and shutdown modes and how such difference is accounted for in risk-ranking. For example, if an SSC that might be judged by the Working Group to be important with a score of "5" for a shutdown/mode-change critical question (with low scores for other four critical questions) could result in a final score less than "40," would it be categorized as a non-risk significant or a low safety significant SSC?*

    (b) Discuss if the weighted sum is always used as the sole guideline or if other constraints are applied.

    (c) Similarly, provide a discussion and examples of how an SSC's importance during external events (i.e., seismic, fire, and tornadoes) might affect its overall importance as applied toward the risk-ranking. Identify the external phenomena that were addressed in order to determine what impact the proposed exemption from environmental and dynamic effects will have on CDF and LERF.

RESPONSE (part a): (R. Chackal)

The use of the weighting scale as described in Addendum 2 of 0PEP02-ZA-0001, Graded Quality Assurance working Group Process, includes the following guidelines:

Score Range	Risk
0 - 20	NRS (Not Risk Significant)
21 - 40	Low
41 - 70	Medium
71 – 100	High

Exceptions

Weighted Score of 25 on any one question (ACC or EOP)..................High Risk

Weighted Score of 15-20 on any one question ....Med Risk

Weighted Score of 9-12 on any one question ....Low Risk

Thus, if a component were to receive a score of "5"on the shutdown/mode change (s/d) question and worst case scenario of "0" on all other questions, the weighted score for the s/d question would be "15" and "0" for all the other questions. The overall score would then be "15". This would initially put it in the NRS category, but as noted above under "exceptions", a score of "15" on any one question would result in a MEDIUM risk for this hypothetical component.

RESPONSE (part b): (R. Chackal)

The weighted sum is not the sole guideline. In addition to the exception rule noted above, the Working Group is guided by the following (excerpted from the referenced procedure addendum):

> "The overall score is used to help the GQA Working Group deterministically evaluate the risk significance. The GQA Working Group can deviate from the guide as necessary to account for special circumstances or the group members' knowledge and insight; Deviations from the guide are to be the exception rather than the rule and are to be documented and highlighted to the CRM Expert Panel. In addition, the GQA Working Group should utilize conservative decision-making in deterministically evaluating risk significance."

An additional constraint is applied whenever the PRA risk is greater than the risk obtained through the use of the weighted scale. In that instance, as shown on Addendum 3 of 0PGP02-ZA-0003, Comprehensive Risk Management, the PRA risk is used as the final risk.

RESPONSE (part c): (R. Chackal)

The external events that are addressed in the STP PRA are: External floods from main cooling reservoir breach; tornado that fails offsite power and the essential cooling pond; seismic events from 0.1 to 0.6g (Note: the SSE for South Texas is 0.1g); and internal fires. All of these external events are included in the STP PRA results and are implicitly included in all Risk Rankings that are based on the PRA. The PRA evaluates seismic events and other external events that are well beyond the design basis external events required to be analyzed.

The first two external initiating events guarantee failure of offsite power and the Essential Cooling Pond. Core damage is assumed under these conditions. Containment response depends upon the status of the On-Line purge system, but the LERF is several orders of magnitude lower than the CDF.

The proposed exemption from environmental effects does not affect any of the external events modeled in the PRA. In terms of dynamic effects, only the seismic external events have an effect on the proposed exemption. The contribution to CDF from seismic events is 7.1×10^{-08} per year and is dominated by loss of offsite power and seismic failure of the emergency diesel generators, seismic failure of the Class 1E 120V Inverters or seismic failure of the Class 1E DC Battery system. Equipment for which exemption to dynamic effects is being requested do not affect CDF or LERF.

32. *During the GQA evaluation, the staff did not emphasize the review of the environmental and seismic analyses in your PRA because the special treatment requirements were not being modified. Discuss how the quality of your PRA, and related analyses to support these exemptions are sufficient to give reliable results.*

RESPONSE:

The PRA and the IPE have been extensively reviewed by the NRC and it's contractors in support of the license amendment on Technical Specification changes (AOT and surveillance test intervals). These reviews have been documented in several Staff Evaluation Reports: "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to the Probabilistic Safety Analysis Evaluation," sent to the Houston Lighting & Power Company under cover letter dated January 21, 1992; "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to the Probabilistic Safety Assessment - External Events," sent to the Houston Lighting & Power Company under cover letter dated August 31, 1993.; and, INDIVIDUAL PLANT EXAMINATION (IPE) - INTERNAL EVENTS, SOUTH TEXAS PROJECT, UNITS 1 AND 2-(STP) (TAC NOS. M74471 AND M74472, dated August 9, 1995.

The PRA is controlled by procedures and guidelines that ensure review of all changes to the models by persons independent from the person making the change and approval by the PRA supervisor. The PRA will be certified under the Westinghouse Owner's Group Peer Review Process. In addition, an independent assessment of the overall control process has been performed using the guidance from the BWR Owner's Group Peer Certification Process. All findings from this self-assessment were documented in the corrective action program and have been corrected. The conclusions from the self assessment indicate that the methods used to control the PRA satisfy the appropriate requirements of Appendix B to 10CFR50. Given the current state-of-the-art in PRA analyses and techniques, and the control of the processes used to make changes to the model, the quality of the PRA is sufficient to achieve reliable results for the graded QA process.

32. *(con't) The Advisory Committee for Reactor Safeguards (ACRS) has suggested, and we are considering, determining the importance of SSCs for seismic, fire, and other external events based on the specific analysis alone. For example, the importance of SSC's for seismic events should be determined by only using the seismic analysis. This reduces the shadowing effect between analyses of different precision. Please describe how importance measures are obtained for the seismic and other external event analyses, and how these measures are used together with the internal events results.*

RESPONSE:

The STP PRA is a fully integrated model of plant risk from all categories of initiators. This means that all initiating events are included in all model quantification. The resulting risk importance measures are determined from sequences that are representative of all the initiating events. Risk importance measures for specific classes of initiating events have not been routinely calculated.

A special evaluation was performed in response to this question that looked at the risk importance measures by class of external event (fires, seismic, external floods). The overall conclusion from this evaluation is that there is no change in basic event importance ranking when looking at the external events in isolation.

32. *(con't) Have any SSC's been identified that are important only for external events?*

RESPONSE: No

32. (con't) Also, since the PRA assumes that the equipment is fully qualified for the environment it must operate in, please explain how you intend to incorporate environmental and seismic effects into your PRA such that you can estimate or bound the aggregate impact of all your proposed special treatment changes.

RESPONSE:

For environmental qualification effects, there are no changes in plant response, equipment operation, failure rates, etc. expected for equipment that is risk important in the PRA. Since these components will remain in the High or Medium Risk categories, no exemption is requested for equipment in these categories. Those components that are not risk significant or of low risk significance may have their environmental qualifications modified, but that is the purpose of grading the QA requirements and determining the attributes necessary to ensure that the component performs its safety related function.

In addition, for seismic events, all systems necessary to mitigate the consequences of the events are included in the PRA model. In the model, the response of the components necessary to support operation of the various systems is determined based on discrete acceleration values. All components of a similar type (e.g., batteries or diesel generators) are assumed to fail at the same time based on these values. This process bounds the aggregate impacts for seismic events for equipment that is necessary to mitigate the consequences of seismic events.

33. *In the licensee's risk categorization process, the safety significance of all system functions are determined by critical question responses assigned by the expert panel - even system functions modeled in the PRA.*

    (a) *Explain how the importance of a component in the system impacts the safety significance of that system.*

    (b) *For example, the licensee's PRA indicates that the Chemical and Volume Control System (CVCS) positive displacement pump is high safety significant, but the Working Group categorized the corresponding system function as low safety significant. We anticipated that the functions supported by a high safety significant SSC should also be categorized as high safety significant. In particular, your new method of having the expert panel directly assign grades to each system function does not seem to fully comport with assigning a safety significance to each system function based on a combination of PRA insights and deterministic insights. Please explain the source of the apparent discrepancy in the categorization. That is, what characteristics of the PRA models led to the high safety significance categorization for the Chemical and Volume Control (CVCS) pump, and how do these contrast with the characteristics assumed by the expert panel in assigning the grades to eventually end up with a low safety significance designation for the corresponding system function? Moreover, explain how such a designation would impact the risk-ranking of a component in the CVCS.*

RESPONSE (part a): (A. Moldenhauer)

Deterministically, a component's importance is directly attributable to the importance of the function supported by the component. However, a component's importance is based not only on deterministic insights, but also includes probabilistic insights if the component is credited in the plant specific PRA. Deterministically, a component's importance is based on the relative contribution that the component provides in support of the system functions. For example, if the function of a check valve is to prevent reverse flow through a centrifugal pump and is not required for containment isolation, then the valve's importance would be based on the function it supports (i.e., protect the pump) and not on the containment isolation function. Probabilistically, a component's importance is based on its function to mitigate an accident or to prevent an initiating event. This includes both the reliability and availability of the component, which impacts the risk categorization of the component.

Response (part b): (A. Moldenhauer)

The functions of the Chemical and Volume Control system (CVCS) positive displacement pump (PDP) are to hydrotest the Reactor Coolant System (RCS), to add chemicals to the RCS for pH and oxygen control, and to provide seal injection flow if both centrifugal charging pumps become inoperable. The Probabilistic Risk Assessment (PRA) credits the PDP pump only when seal injection flow is not available from the centrifugal charging pumps. Use of the PDP pump requires operator action to start the PDP and to maintain flow to the individual RCP seal injection lines. For event sequences that include failure of plant offsite power, success also requires that the Technical Support Center diesel generator be available to power the PDP.

The PRA categorizes the PDP pump as HIGH due to previous poor performance. Both availability and reliability have continued to improve, and it is expected that updated risk categorization studies will result in the PDP being reclassified. The PRA risk categorization process is a compilation of sensitivity studies. The sensitivity studies demonstrate the robustness of the risk categorization process by providing analysis of the following:

- effects of scheduled maintenance,
- removal of operator recovery,

- removal of common cause failures,
- increased failure rates over multiple systems, and
- reduced steam generator tube rupture frequency on large early release frequency.

The average At-Power Probabilistic Risk Assessment (PRA) risk categorization, along with the above sensitivity studies, are used to produce a final PRA component risk categorization.

The basis for the HIGH categorization of the PDP is its importance during certain scheduled maintenance activities. The PDP had high importance in five of the twenty-one sensitivity studies. In all other studies (e.g., removal of operator recovery, removal of common cause failures, etc.), the PDP was ranked no higher than MEDIUM. These sensitivity studies also included the average CDF and LERF where the PDP was categorized LOW.

The importance calculation affecting the categorization for the PDP is the Fussell-Vesely (FV) importance. FV measures the fraction of the overall risk involving sequences in which the component (i.e., PDP) is postulated to fail.

- FV is a better indicator of component reliability on the selected figure-of-merit (i.e., core damage frequency);
- FV doesn't emphasize those components with high reliability and low overall fractional importance even though the impact of removing these from service could have significant impact; and
- Conversely, FV does highlight those components with low reliability levels which result in high fractional importance although the associated reduction in risk, given component success, is small.

It is expected that with the PDP's recent improved reliability and availability, the PRA importance categorization will result in a lower classification. Consideration for the low reliability and availability of this component demonstrates the robustness of the GQA risk categorization process.

35. *In Section 5.2.4.1, page 17 of your submittal, it is stated that you have identified approximately 100 non-safety-related SSCs that have been categorized as high safety significant and medium safety significant. To help us better understand your categorization process, please provide a list of these SSCs and a summary description of why they are important. Explain how this categorization is reflected in the plant PRA. The staff needs to have an understanding about the extent to which the PRA models relatively more significant plant equipment. (It may help to group certain components, as appropriate, when describing their-risk significance).*

RESPONSE: (R. Chackal)

Currently, there are 374 non-safety related SSCs risk ranked MEDIUM or HIGH. Of these, 220 are fire dampers in the Mechanical Auxiliary Building HVAC (HM) system. Attachment 1 provides a representative sample by listing only the Unit 1, train A components. In accordance with our implementation process, these components are evaluated to determine what additional quality assurance controls are to be applied to them.

The Attachment 1 listing shows the PRA risk, where applicable and/or modeled and the final risk. In some cases, there is no PRA risk because the component is not explicitly or implicitly modeled (e.g., AF turbine steam inlet drain line water level sensing switch). In other cases, there is no PRA risk because the component is implicitly modeled as part of a larger component (e.g., the manual control station for the RHR heat exchanger flow control valve is implicitly modeled as part of the valve). In the remaining cases, the final risk is sometimes driven by the PRA risk (e.g., positive displacement pump motor) or by the deterministic risk.

As is the case with safety related components, the final risk is a blending of the PRA risk and the deterministic risk. Where the component is not explicitly modeled by the PRA, the deterministic risk becomes the final risk. Fire dampers are examples of these and make up a large percentage of the Attachment 1 components.

SY	TYPE	ID	COMPONENT DESCRIPTION	PRA	RISK	COMMENTS
AF	IBISSW	N1AFLSH7600	TDAFWP #14 T&T VALVE STEAM INLET DRAIN LINE WATER LEVEL		MEDIUM	PART OF LOOP IS USED TO MONITOR LEVEL IN THE TURBINE DRIVEN AUXILIARY FEED WATER PUMP INLET STEAM DRAIN LINES. THE LEVEL SWITCH ACTUATES ON HIGH LEVEL TO PROVIDE AN INPUT SIGNAL (ALARM DATA POINT) ON HIGH LEVEL ABOVE SET POINT TO THE PROTEUS PLANT COMPUTER. AN UNDETECTED HIGH LEVEL COULD CAUSE AN OVERSPEED TRIP OF THE TURBINE ON START-UP. REFER TO FUNCTION 4.3 AND ITS BASIS.
AF	IXMITR	N1AFLE7600	TDAFWP #14 T&T VALVE STEAM INLET DRN LINE WATER LVL		MEDIUM	PART OF LOOP IS USED TO MONITOR LEVEL IN THE TURBINE DRIVEN AUXILIARY FEED WATER PUMP INLET STEAM DRAIN LINES. THE LEVEL SWITCH ACTUATES ON HIGH LEVEL TO PROVIDE AN INPUT SIGNAL (ALARM DATA POINT) ON HIGH LEVEL ABOVE SET POINT TO THE PROTEUS PLANT COMPUTER. AN UNDETECTED HIGH LEVEL COULD CAUSE AN OVERSPEED TRIP OF THE TURBINE ON START-UP. REFER TO FUNCTION 4.3 AND ITS BASIS.
AF	PIPE	N1AFFO7552	LUBE OIL PUMP 15 RECIRC FLOW ORIFICE		MEDIUM	USED TO MAINTAIN PROPER OIL FLOW AND PRESSURE. FAILURE COULD IMPACT OPERATION OF THE TURBINE
AF	PIPE	N1AFFO7553	TERRY TURBINE GOVERNOR END BRG LUBE OIL SUPPLY FLOW ORIFICE		MEDIUM	USED TO MAINTAIN PROPER OIL FLOW AND PRESSURE. FAILURE COULD IMPACT OPERATION OF THE TURBINE
CV	CKTBRK	N1CVHS0286	POS DISP CHG PUMP 1A SEL SW		MEDIUM	MANUALLY OPERATED TO START POSITIVE DISPLACEMENT PUMP. RISK IS ONE LEVEL LOWER THAN PUMP RISK
CV	MOTOR	N1CVPA102A	CVCS POSITIVE DISPLACEMENTIC HARGING PUMP MOTOR TPNS: 2R171NPA102A	H	HIGH	PRIMARILY USED FOR HYDROTESTING THE RCS. PROVIDES A MEANS FOR ADDING CHEMICALS TO THE RCS FOR pH AND OXYGEN CONTROL. PROVIDES SEAL INJECTION FLOW IF BOTH CCPs ARE INOPERABLE
CV	VALVE	N1CVLY3119	CVCS AUXILIARY SPRAY LV-3119 SOLENOID VALVE	L	MEDIUM	OPENS MAIN VALVE ONLY WHEN SUPPLYING AUX SPRAY TO PZR TO COLLAPSE STM BUBBLE/COOL PZR DURING COOLDOWN OR TO DEPRESSURIZE SG IN CASE OF TUBE RUPTURE. MAIN VALVE IS 2ND VALVE AFTER CV-0009 TO PROVIDE RCS PRESS BOUNDARY INTEGRITY. MAIN VALVE FAILS CLOSED

SY	TYPE	ID	COMPONENT DESCRIPTION	PRA	RISK	COMMENTS
HE	DAMPER	7V101VFF078	MAB MAIN EXHAUST AIR FUSIBLE LINK FIRE DAMPER (Note: risk approved by EP, to be implemented @ 6-month review)		MEDIUM	FIRE DAMPERS PROVIDE CAPABILITY TO ISOLATE HVAC TRAINS, SUB-SYSTEMS OR DUCTS TO PROTECT REDUNDANT EQUIPMENT NEEDED FOR SAFE SHUTDOWN OF THE REACTOR IN THE EVENT OF A FIRE. FIRE DAMPERS, LOCATED INSIDE HVAC DUCT, ACTIVATE WHEN INTERNAL DUCT TEMPERATURE MELTS FUSIBLE LINK OR UPON RECEIPT OF ELECTRO-THERMAL SIGNAL FROM FIRE DETECTION SYSTEM
HE	IBISSW	N1HEXSH9583	EAB OUTSIDE AIR INTAKE HIGH SMOKE DETECTION SWITCH		MEDIUM	DETECTOR PROVIDES A SIGNAL TO ISOLATE MAIN CONTROL ROOM AND TSC INLET HVAC DAMPERS.
HE	IBISSW	N1HEXSH9601	CONTROL ROOM TRAIN A RETURN AIR HIGH SMOKE DETECTION SWITCH		MEDIUM	SMOKE DETECTOR IN THE RETURN AIR DUCT OF ONE OF THREE OF THE CONTROL ROOM ENVELOPE CLEAN-UP AIR HANDLING UNITS (AHU). ACTUATES UPON THE DETECTION OF SMOKE TO PROVIDE AN ANNUNCIATION (22M-3-05F) IN THE CONTROL ROOM (CR).
HE	IXMITR	N1HEXE9601	CONTROL ROOM TRAIN A RETURN AIR SMOKE DETECTOR		MEDIUM	SMOKE DETECTOR IN THE RETURN AIR DUCT OF ONE OF THREE OF THE CONTROL ROOM ENVELOPE CLEAN-UP AIR HANDLING UNITS (AHU). ACTUATES UPON THE DETECTION OF SMOKE TO PROVIDE AN ANNUNCIATION (22M-3-05F) IN THE CONTROL ROOM (CR).
HM	CKTBRK	N1HMHS9419	TIE DAMPER FV-9419		MEDIUM	REFER TO ASSOCIATED COMPONENT
HM	DAMPER	[VARIOUS]	[FIRE DAMPER, TYPICAL. TOTAL OF 220 RANKED MEDIUM]		MEDIUM	FIRE DAMPERS PROVIDE CAPABILITY TO ISOLATE HVAC TRAINS, SUB-SYSTEMS OR DUCTS TO PROTECT REDUNDANT EQUIPMENT NEEDED FOR SAFE SHUTDOWN OF THE REACTOR IN THE EVENT OF A FIRE. FIRE DAMPERS, LOCATED INSIDE HVAC DUCT, ACTIVATE WHEN INTERNAL DUCT TEMPERATURE MELTS FUSIBLE LINK OR UPON RECEIPT OF ELECTRO-THERMAL SIGNAL FROM FIRE DETECTION SYSTEM.

SY	TYPE	ID	COMPONENT DESCRIPTION	PRA	RISK	COMMENTS
IA	BLOWER	8Q111MCO0106	INSTRUMENT AIR COMPRESSOR 11	M*	MEDIUM	PROVIDES CONTINUOUS SUPPLY OF FILTERED, DRY, OIL-FREE COMPRESSED AIR AT SUITABLE PRESSURE AND FLOWRATE FOR PNEUMATIC INSTRUMENT OPERATION AND CONTROL OF PNEUMATIC VALVE AND DAMPER ACTUATORS. DETERMINISTICALLY RANKED AS LOW. FINAL RISK BASED ON PRA.
IA	VALVE	8Q111TIA0027	INSTRUMENT AIR RECEIVER OUTLET CHECK VALVE	M*	MEDIUM	PREVENT BACKFLOW WHEN THE SERVICE AIR SYSTEM IS PROVIDING AIR TO THE INSTRUMENT AIR SYSTEM. DETERMINISTICALLY RANKED AS LOW. FINAL RISK BASED ON PRA.
IA	VESSEL	8Q111MTS0162	INSTRUMENT AIR RECEIVER	M*	MEDIUM	SUPPLIES COMPRESSED AIR FOR PNEUMATIC CONTROLS, ACTUATION OF VALVES, DAMPERS AND SIMILAR DEVICES. AIR RECEIVER VOLUME IS BASED ON 2 MINUTE NORMAL SUPPLY OF INSTRUMENT AIR IN THE EVENT OF COMPRESSOR TRIP. DETERMINISTICALLY RANKED AS LOW. FINAL RISK BASED ON PRA.
RC	IBISSW	N1RCPS0455Z	RCS PRZR 1A PRZR PRESS CONT SEL SW		MEDIUM	ALLOWS OPERATOR TO SELECT ONE OF FOUR PRESSURIZER PRESSURE CHANNELS
RC	ICLOOP	N1RCP0655B	RCS PRZR 1A LOOP 4 SPRAY VALVE		MEDIUM	THIS LOOP SENSES PRESSURIZER PRESSURE AND PROVIDES A CONTROL SIGNAL TO THE PRESSURE SPRAY VALVES TO OPEN THE VALVE TO RELIEVE PRESSURE IN THE PRESSURIZER
RC	ICNTRL	N1RCPC0655A	RCS PRZR 1A LOOP 4 SPR VALVE PCV-0655 CONTROLLER		MEDIUM	ACTS TO MODULATE PCV0655A
RC	ICNTRL	N1RCPC0655B	RCS PRZR 1A LOOP 4 SPR VALVE PCV-0655B CONTR		MEDIUM	MODULATES PCV-0655B OPEN ON HIGH PRESSURE TO PREVENT THE PRESSURIZER PRESSURE FROM REACHING THE SETPOINT OF THE PORVs
RC	ICNTRL	N1RCPC0655C	RCS PRZR 1A LOOP 4 SPR VALVE PCV-0655 CONTROLLER		MEDIUM	MODULATES PCV-0655C OPEN ON HIGH PRESSURE TO PREVENT THE PRESSURIZER PRESSURE FROMJ REACHING THE SETPOINT OF THE PORVs

SY	TYPE	ID	COMPONENT DESCRIPTION	PRA	RISK	COMMENTS
RC	ICNTRL	N1RCPK0655A	PRESSURIZER 1A PORV (PCV-655A) I/P CONVERTER		MEDIUM	THE THREE CONTROL STATIONS (PK0655A, B, AND C) LOCATED IN THE CONTROL ROOM PROVIDE THE OPERATOR MANUAL OR AUTOMATIC CONTROL OVER THE PRESSURIZER SPRAY VALVES. CONTROL OF THE PRESSURIZER SPRAY IS REQUIRED TO PREVENT THE PRESSURE OF THE PRESSURIZER FROM EXCEEDING THAT OF THE PRESSURIZER RELIEF VALVES. PK0655A IS AN NCB CARD IN 7300 CABINET
RC	ICNTRL	N1RCPK0655B	RCS PZR 1A LOOP 1D SPRAY VLV (PCV-0655B) I/P CONVERTER		MEDIUM	THREE HAND CONTROL STATIONS (PK0655A, B, AND C) IN THE CONTROL ROOM ARE AVAILABLE TO PROVIDE THE OPERATOR CONTROL OVER THE PRESSURIZER SPRAY VALVES. CONTROL OF THE PRESSURIZER SPRAY IS REQUIRED TO PREVENT THE PRESSURE OF THE PRESSURIZER FROM EXCEEDING THAT OF THE PRESSURIZER RELIEF VALVES.
RC	ICNTRL	N1RCPK0655C	RCA PRZR 1A LOOP 1 SPRAY PCV-0655C CONT STA		MEDIUM	FAILURE COULD CAUSE POSSIBLE LOSS OF EFFECTIVE OPERATOR CONTROL OF PRESSURIZER SPRAY.
RC	INDREC	N1RCLG3660	REACTOR COOLANT SYSTEM LOOP 1A MID LOOP OPERATIONS LEVEL GAUGE		MEDIUM	PROVIDES LOCAL INDICATION, ERFDADS INFORMATION, CONTROL ROOM INDICATION, OF REACTOR VESSEL WATER LEVEL DURING MIDLOOP OPERATIONS.
RC	INDREC	N1RCLR3660	RCS LEVEL LOOP A AND C MID LOOP OPERATION (2-PEN)		MEDIUM	SUPPORTS MID-LOOP OPERATIONS
RC	INDREC	N1RCPI0407A	RCS LOOP 1 WR PRESS		MEDIUM	AUX SHUTDOWN PANEL INDICATION

SY	TYPE	ID	COMPONENT DESCRIPTION	PRA	RISK	COMMENTS
RC	INTCPM	N1RCPY3656C	PRESSURIZERILO OP 1A SPRAY VALVE PCV-0655C I/P PRESSURE CONVERTER		MEDIUM	ONE OF 2 PRESSURIZER SPRAY CONTROL VALVES USED TO PROVIDE SPRAY TO THE PRESSURIZER TO ASSIST IN EQUALIZING THE BORON CONCENTRATION BETWEEN THE REACTOR COOLANT LOOPS AND THE PRESSURIZER. THESE VALVES ARE AUTOMATICALLY MODULATED OPEN ON HIGH PRESSURE TO PREVENT THE PRESSURIZER PRESSURE FROM REACHING THE OPERATING (SET) POINT OF THE POWER-OPERATED RELIEF VALVES FOLLOWING A STEP LOAD REDUCTION.
RC	IXMITR	N1RCLIT3662	RCS MID LOOP OPERATIONS LEVEL INDICATING TRANSMITTER		MEDIUM	PROVIDES LOCAL INDICATION OF REACTOR VESSEL WATER LEVEL DURING MIDLOOP OPERATIONS.
RC	IXMITR	N1RCLT0675	PRESSURIZER COLD CAL LEVEL TRANSMITTER		MEDIUM	RC-L-0675 IS A FIFTH NON-CLASS 1E PRESSURIZER LEVEL TRANSMITTER/INDICATOR, CALIBRATED FOR LOW TEMPERATURE CONDITIONS. IT PROVIDES SIGNALS FOR PRESSURIZER WATER LEVEL AND ERFDADS DURING STARTUP, SHUTDOWN, AND REFUELING OPERATIONS.
RC	IXMITR	N1RCLT3660	REACTOR COOLANT SYSTEM LOOP 1A OPERATIONS LEVEL TRANSMITTER		MEDIUM	THIS LEVEL LOOP SENSES REACTOR COOLANT LEVEL AND PROVIDES A RECORDING OF THIS LEVEL AND LOW-LOW LEVEL ANNUNCIATION (01M2-1F) IN THE CONTROL ROOM DURING MID LOOP OPERATION. THIS INFORMATION PROVIDES THE OPERATOR INFORMATION TO ASSIST IN MAINTAIN LEVEL WITHIN THE MID LOOP OPERATING BAND.
RC	MECFUN	9C241NXN101	REACTOR VESSEL-TO-CAVITY SEAL RING		MEDIUM	USED DURING REFUELING OPERATIONS
RC	MECFUN	RC1014HL5003W	REACTOR COOLANT SYSTEM MECHANICAL SNUBBER MODEL NUMBER: AD5501		MEDIUM	LIMITS PIPE STRESS DURING SEISMIC EVENTS. RISK BASED ON LOW PROBABILITY AND VERY LOW MAGNITUDE OF SEISMIC EVENTS AT STP

SY	TYPE	ID	COMPONENT DESCRIPTION	PRA	RISK	COMMENTS
RC	MECFUN	RC1014HL5005S	REACTOR COOLANT SYSTEM MECHANICAL SNUBBER MODEL NUMBER: AD5501		MEDIUM	LIMITS PIPE STRESS DURING SEISMIC EVENTS. RISK BASED ON LOW PROBABILITY AND VERY LOW MAGNITUDE OF SEISMIC EVENTS AT STP
RC	MECFUN	RC1014HL5009	REACTOR COOLANT SYSTEM MECHANICAL SNUBBER MODEL NUMBER: AD501		MEDIUM	LIMITS PIPE STRESS DURING SEISMIC EVENTS. RISK BASED ON LOW PROBABILITY AND VERY LOW MAGNITUDE OF SEISMIC EVENTS AT STP
RC	MECFUN	RC1014HL5026	REACTOR COOLANT SYSTEM MECHANICAL SNUBBER MODEL NUMBER: AD501		MEDIUM	LIMITS PIPE STRESS DURING SEISMIC EVENTS. RISK BASED ON LOW PROBABILITY AND VERY LOW MAGNITUDE OF SEISMIC EVENTS AT STP
RC	VALVE	7R141TRC0203	(IRC) RV HD FE 3659A ISOL BYPASS		MEDIUM	NORMALLY OPEN ROOT VALVE CONNECTED TO RCS PRESSURE BOUNDARY. PRESSURE BOUNDARY FAILURE OF VALVE MITIGATED BY UPSTREAM FLOW RESTRICTOR
RC	VALVE	7R141TRC0518	(IMB) RCS LEVEL SIGHT GLASS LIT-3662 DRAIN VALVE		MEDIUM	USED DURING MID-LOOP OPERATIONS
RC	VALVE	7R141ZRC0208	(IRC) LOOP 1 LEVEL TRANSMITTER LT-3660 ISOL VLV		MEDIUM	NORMALLY OPEN ROOT VALVE CONNECTED TO RCS PRESSURE BOUNDARY. PRESSURE BOUNDARY FAILURE OF VALVE MITIGATED BY UPSTREAM FLOW RESTRICTOR
RC	VALVE	7R141ZRC0210	(IMB) LOOP C LG-3661 UPPER ROOT VALVE		MEDIUM	SUPPORTS MID-LOOP OPERATIONS
RC	VALVE	7R141ZRC0211	(IMB) LOOP 1 LEVEL GAGE LG-366O VENT VALVE		MEDIUM	SUPPORTS MID-LOOP OPERATIONS

SY	TYPE	ID	COMPONENT DESCRIPTION	PRA	RISK	COMMENTS
RC	VALVE	7R141ZRC0212	(IMB) LOOP A MID LOOP LEVEL GAGE, LG-3660 DRAIN VALVE		MEDIUM	SUPPORTS MID-LOOP OPERATIONS
RC	VALVE	7R141ZRC0213	(IMB) LOOP A MID LOOP LEVEL GAGE, LG-3660 UPPER ISOL		MEDIUM	NORMALLY OPEN ROOT VALVE CONNECTED TO RCS PRESSURE BOUNDARY. PRESSURE BOUNDARY FAILURE OF VALVE MITIGATED BY UPSTREAM FLOW RESTRICTOR
RC	VALVE	7R141ZRC0214	(IMB) LOOP A LG-3660 LOWER ROOT VALVE		MEDIUM	SUPPORTS MID-LOOP OPERATIONS
RC	VALVE	7R141ZRC0215	(IMB) LOOP A LG-3660 LOWER ROOT VALVE		MEDIUM	SUPPORTS MID-LOOP OPERATIONS
RC	VALVE	7R141ZRC0216	(IMB) LOOP A MID LOOP LEVEL SENSING LINE VENT		MEDIUM	USED DURING MID-LOOP OPERATIONS
RC	VALVE	7R141ZRC0217	(IMB) LOOP 3 LEVEL GAGE LG-3661 VENT VALVE		MEDIUM	SUPPORTS MID-LOOP OPERATIONS
RC	VALVE	7R141ZRC0218	(IMB) LOOP 3 LEVEL GAUGE LG-3661 DRAIN VALVE		MEDIUM	SUPPORTS MID-LOOP OPERATIONS
RC	VALVE	7R141ZRC0219	(IMB) LOOP 3 LEVEL GAGE LG-3661 UPPER ISOLATION		MEDIUM	NORMALLY OPEN ROOT VALVE CONNECTED TO RCS PRESSURE BOUNDARY. PRESSURE BOUNDARY FAILURE OF VALVE MITIGATED BY UPSTREAM FLOW RESTRICTOR
RC	VALVE	7R141ZRC0220	(IMB) LOOP 3 LEVEL GAUGE LG-3661 LOWER ISOLATION		MEDIUM	NORMALLY OPEN ROOT VALVE CONNECTED TO RCS PRESSURE BOUNDARY. PRESSURE BOUNDARY FAILURE OF VALVE MITIGATED BY UPSTREAM FLOW RESTRICTOR

SY	TYPE	ID	COMPONENT DESCRIPTION	PRA	RISK	COMMENTS
RC	VALVE	7R141ZRC0221	(IMB) LOOP 3 LEVEL GAGE LG-3661 LOWER ISOLATION		MEDIUM	NORMALLY OPEN ROOT VALVE CONNECTED TO RCS PRESSURE BOUNDARY. PRESSURE BOUNDARY FAILURE OF VALVE MITIGATED BY UPSTREAM FLOW RESTRICTOR
RC	VALVE	7R141ZRC0222	(IMB) LOOP 3 LEVEL TRANS LT-3661 VENT VALVE		MEDIUM	USED DURING MID-LOOP OPERATIONS
RH	ICNTRL	N1RHHC0864	RHR HEAT EXCHANGER 1A CONTROL		HIGH	THE MANUAL CONTROL STATION PROVIDES REMOTE MANUAL CONTROL OF THE TRAIN A RHR HEAT EXCHANGER FLOW CONTROL VALVE FROM THE CONTROL ROOM OR THE AUX SHUTDOWN PANEL. THIS VALVE DOES NOT PERFORM A SAFETY FUNCTION. HOWEVER, THE VALVE IS NORMALLY OPEN AND FAILS OPEN TO ENSURE CORRECT POSITIONING DURING SAFETY INJECTION AND SAFE SHUTDOWN OPERATION. THE VALVE IS PROVIDED TO MANUALLY CONTROL THE REACTOR COOLANT FLOW THROUGH THE RHR HEAT EXCHANGER AND, SUBSEQUENTLY, THE RATE OF COOLDOWN OF THE RCS SYSTEM.
RH	ICNTRL	N1RHHK0864	RHR HEAT EXCHANGER 1A CONTROL		HIGH	THE MANUAL CONTROL STATION PROVIDES REMOTE MANUAL FLOW CONTROL THROUGH ONE OF THREE TRAINED RHR HEAT EXCHANGERS FROM THE CONTROL ROOM. THE FLOW CONTROL VALVE DOES NOT PERFORM A SAFETY FUNCTION, HOWEVER, THE VALVE IS NORMALLY OPEN AND FAILS OPEN TO ENSURE CORRECT POSITIONING DURING SAFETY INJECTION AND SAFE SHUTDOWN OPERATION.
RH	RELAY	N1RHFY3860	RHR HEAT EXCHANGER 1A OUTLET VALVE FV-3860 CURRENT /PNEUMATIC CONVERTOR		HIGH	RHR HEAT EXCHANGER FLOW CONTROL: THE PNEUMATIC TRANSDUCER (FY) RECEIVES AN ANALOG ELECTRICAL SIGNAL FROM A HAND CONTROLLER IN THE CONTROL ROOM AND CONVERTS THE ELECTRICAL SIGNAL TO A PNEUMATIC SIGNAL TO PROVIDE FOR THE POSITIONING OF AN AIR OPERATED BUTTERFLY VALVE (FV) TO CONTROL REACTOR COOLANT FLOW THROUGH THE RHR HEAT EXCHANGER AND, SUBSEQUENTLY, THE RATE OF RCS COOLDOWN. PERFORMS NO SAFETY-RELATED FUNCTION. NORMALLY OPEN AND FAILS OPEN TO ENSURE CORRECT POSITIONING DURING SAFETY INJECTION, POST ACCIDENT AND THE ABILITY TO REACH SAFE SHUTDOWN.

SY	TYPE	ID	COMPONENT DESCRIPTION	PRA	RISK	COMMENTS
SI	INTCPM	N1SIFY3857	RHR HEAT EXCHANGER 1A FCV-0851 CURRENT /PNEUMATIC CONVERTER		MEDIUM	PROVIDES FOR THE CONVERSION FROM AN ELECTOMAGNETIC SIGNAL TO A PNEUMATIC PRESSURE TO CONTROL VALVE FCV0833 FROM A SIGNAL FROM THE OUTPUT OF THE REMAINDER OF THE LOOP.

36. *In estimating the importance measures, Fussell-Vesely (FV) and Risk Achievement Worth (RAW), you have used the mean values of the parameters in the ratios. This practice usually results in reasonable approximation; however, this may not be the case for parameters whose epistemic uncertainties are very large. Please explain if this problem applies to your proposal and discuss how you will resolve it.*

RESPONSE: (A. Moldenhauer)

Per a telephone conversation with the NRC staff on March 6th, 2000, the question concerning epistemic uncertainty can be addressed by calculating component importance for different categories of external events. External events, in general, rarely occur and, therefore, have large uncertainties. Sensitivity studies were performed to determine component importance associated with the following categories of external events: fires, floods, and seismic initiating events. A full quantification of the PRA model is performed for each sensitivity study of the external event category. Each category contains more than one initiator to describe the event. For example, the STP PRA analyzes seismic initiating events using four initiators. These are as follows:

Initiator	Description	Frequency
SEISM1	SEISMIC EVENT - G LEVEL 0.1	3.02E-05
SEISM2	SEISMIC EVENT - G LEVEL 0.2	2.89E-06
SEISM3	SEISMIC EVENT - G LEVEL 0.4	7.74E-07
SEISM4	SEISMIC EVENT - G LEVEL 0.6	6.14E-08

The sensitivity studies for fire and flood have similar classifications containing similar initiating events.

The same PRA ranking methodology used to calculate component importance was used for these sensitivity studies. In each case, the component's risk rank resulting from the sensitivity study was never more conservative than the current composite PRA risk rank. The following table represents changes from the composite PRA risk ranking to the sensitivity study component risk rankings:

	External Initiating Events		
	Fires	Floods	Seismic
No. of Components Remaining High	8	0	1
Change from High to Medium	38	13	8
Change from High to Low	251	281	288
Change from High to Medium-R	0	3	0
No. Remaining Medium-R	0	0	0
Change from Medium-R to Medium	3	0	0
Change from Medium-R to Low	134	137	137
No. Remaining Medium	62	0	0
Change from Medium to Low	170	232	232
No. Remaining Low	448	448	448
Total	1114	1114	1114
Note, there were no increases in the PRA ranking associated with this study			

The above results for the sensitivity studies demonstrate that no component increased in risk rank when analyzing only for the external event categories. For example, if the PRA rank were based only on fire initiators, there would be 289 fewer components in the high rank category, and 170 fewer components in the medium rank category.

The main reason component importance has decreased or stayed the same is due to the overall importance that external events have on the PRA model. For the most part, fires, floods, and seismic events guarantee failure of affected components. Those components that are affected by external events and are guaranteed failed will generally have a low risk ranking since the reliability and availability of the component does not impact the mitigation of accident/transient events. Note that all components in the PRA model are ranked at least low.

As shown by this analysis, the STP PRA risk ranking process is not susceptible to the influence of external events and their epistemic uncertainties. These sensitivity studies provided no new information to the PRA risk ranking process. Therefore, the STP risk rank process appropriately factors in the impacts of external events, and STP has no plans to change the current PRA risk ranking process based on these findings.

37. You have taken the "Graded Quality Assurance" addendum from the "Comprehensive Risk Management" procedure (Rev. 2 dated 01/02/97) and issued a new procedure on "Graded Quality Assurance Working Group Process" (Rev. 0 dated 8/12/98). The new procedure has added explicit guidance for assigning components a lower significance than the safety significance of the function they support. The licensee's current guidance is as follows:

> *If the component failure will fail the function or if credit for component reliability cannot be taken, then the component is ranked at the same risk as the highest risk function it supports.*
>
> *As a general rule of thumb, if redundancy or backup is available and the reliability of the associated components has been good, the critical questions for the component can be answered at a lower value than given for the highest risk function supported by the component. However, the WG [working group] should use conservative judgement when taking credit for component redundancy*

You use five "critical questions" to determine risk of a system function or component ranking. These questions are related to the impact on initiating event, risk significant system, accident/transient, emergency operating procedures, and shutdown/mode change. The response to these questions is one of any points ranging from "0" to "5." For example a score of "1" denotes "positive response having insignificant impact and/or occurring very rarely" and a score of "5" denotes "positive response having high impact and/or occurring frequently."

If this procedure is to be used for the proposed exemption request, explain how many points lower the "critical question" score can be assigned to a redundant component relative to the function's critical question score. For example, if a critical question score is "5" for a particular function, discuss whether a score of "4" or lower should be assigned for the relevant redundant components. Discuss whether all five (or all non-zero) critical question scores for all redundant components are scored lower than the scores for their function. If only "selected" redundant components are scored lower, provide the basis for such a decision. If only selected critical questions are scored lower, provide the basis for such a decision. If a component is placed in a lower safety significance category as a result of being assigned a lower critical question score, discuss how a justification (including a description of how a component is judged to be highly reliable) is developed.

RESPONSE: (G. Schinzel)

A component's categorization may be considered for one level lower than the most limiting system function supported when there are diverse means of satisfying the system function. In addition, if there are multiple, independent means of satisfying the system function, a reduction in categorization may be considered. Merely having multiple trains of a component available in a system did not automatically result in a lower risk categorization for a component.

When considering whether component redundancy or diversity is a factor, the Working Group evaluates redundancy based on system operating configuration, reliability history, recovery time available, and other factors. As quoted in the text of the question, procedure 0PEP02-ZE-0001, Graded Quality Assurance Process, does not provide guidance on how many points lower each component critical question can be answered when factoring in redundancy. Typically, if credit is taken for redundancy, critical questions for the components are assigned scores of one to two points lower than the corresponding question score for the system function. However, if the function critical question is answered with a score of "1" or "2", then the component critical question cannot be answered with a "0". All five critical questions are typically scored lower in this manner when factoring in redundancy. The final risk of the component cannot be "NRS" if the system function is "LSS", and cannot be more than one risk level lower than the system function.

In evaluating component redundancy, the Working Group examines the effect of the failure of the component on each system function supported by that component. The primary consideration is whether failure of the component will fail or severely degrade the function. If the answer is no, then component redundancy may be factored in, as long as the component's reliability and that of its redundant counterpart have been satisfactory. Component reliability is subjectively evaluated through reviews of Condition Reports, System Health Reports, inputs from the System Engineer, and input from the Operations representative on the Working Group. A component could be considered reliable when the component demonstrates strong operating performance with few deficiencies, the component has no open concerns based on industry operating experience, and site operating experience reflects no negative reliability trends or concerns.

As noted in the procedure, the Working Group utilizes conservative judgment when taking credit for component redundancy. The risk categorization recommendations and their bases are not finalized until the GQA Working Group presents these recommendations to the Comprehensive Risk Management Expert Panel for review and approval.

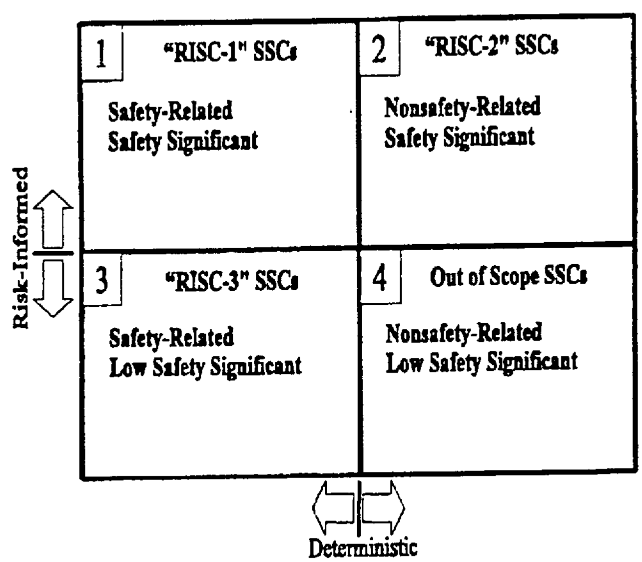
SOUTH TEXAS PROJECT

REQUEST FOR INFORMATION TO SUPPORT INITIATIVES TO INCORPORATE RISK-INFORMED INSIGHTS INTO 10 CFR PART 50 REGULATIONS

1. *In SECY-99-256, "Rulemaking Plan for Risk-Informing Special Treatment Requirements," the NRC staff describes a scheme for categorizing SSCs according to their safety significance and status under the deterministic safety-related regime. This scheme divides SSCs into 4 bins. (See Figure 1.) Risk-informed safety class 1, or RISC-1 SSCs are presently safety-related and are determined to be safety significant by a risk-informed categorization process. RISC-2 SSCs are not presently safety-related, but have been determined to be safety significant by a risk-informed categorization process. RISC-3 SSCs are presently safety-related, but have been found to be of low safety significance by a risk-informed categorization process. Remaining SSCs are expected to be out of the scope of special treatment requirements, though other regulatory controls may still apply.*

   In an effort to equate current Risk-informed Rulemaking efforts with your exemption request, please describe how the STP risk categorizations compare to these classifications.

Figure 1: Diagram of Categorization and Treatment



RESPONSE:

The STP NRC-approved risk categorization process also classifies components into four categories:

- HIGH,
- MEDIUM,
- LOW, and
- NON-RISK SIGNIFICANT (NRS)

These risk categorizations are procedurally covered in 0PEP02-ZA-0001, Graded Quality Assurance Working Group Process.

As discussed in procedure 0PGP02-ZA-0003, Comprehensive Risk Management, STP further defines programmatic controls of the categorized components as follows:

- FULL,
- BASIC,
- TARGET, and
- NONE.

These programmatic controls define the level of both regulatory and administrative treatment that individual components will receive.

Figure 2: STP Programmatic Controls

	Safety Related	Non-Safety Related
Risk-Informed Application	Full	Target
	Basic	No QA

Deterministic

FULL controls apply to safety-related components that have been risk-categorized as HIGH. These components currently receive complete regulatory controls and special treatment applications, and these controls will continue once the Exemption request is granted. FULL controls would equate to the controls that are recommended for RISC-1 SSCs.

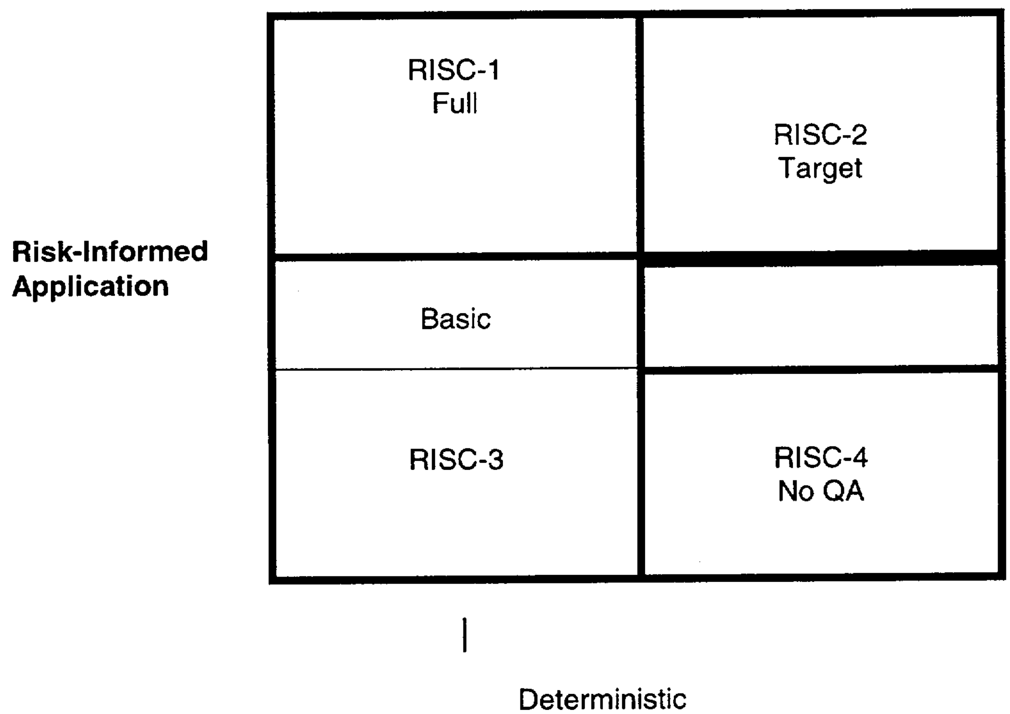
BASIC controls apply to safety-related components that have been risk-categorized as MEDIUM, LOW, or NRS. BASIC controls are defined as good business practices which reflect the most economical and efficient means of conducting business while maintaining compliance with the basic requirements of 10CFR50, Appendix B. Since STP is only requesting exemption for components categorized as LOW and NRS, all special treatments would continue to apply to MEDIUM components following grant of the Exemption request, and the FULL administrative controls would also be applied to the component critical attributes for MEDIUM components. Upon grant of the Exemption, LOW and NRS components would be exempt from the regulatory special treatments, however, since LOW components also have critical attributes defined for them, these critical attributes would be factored into the administrative treatment for these components. LOW and NRS components would be procured commercial, and the Corrective Action Program (CAP) would still fully apply to these components. In addition, these components would be monitored on a system or train level per the Maintenance Rule, and the GQA feedback process would evaluate the satisfaction of performance for possible component recategorization. Comparing this to the proposed 'four boxes', BASIC controls would apply to the lower half of RISC-1 and would encompass all of RISC-3 (See Figure 3).

In addition, the proposed RISC-1 box defines these components as 'safety-related, safety significant'. The STP approach would place HIGH and MEDIUM safety-related components into the RISC-1 box. The RISC-3 box is defined as 'safety-related, low safety significant'. STP would place LOW and NRS safety-related components into the RISC-3 box.

TARGET controls apply to non-safety-related components that have been risk-categorized as HIGH or MEDIUM. TARGET controls are subject to specific regulatory special treatment controls and to additional administrative controls. These controls will be specifically 'targeted' to the critical attributes that resulted in the component being categorized as HIGH or MEDIUM. 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 function when demanded. TARGET controls directly equate to the RISC-2 proposed box of 'non-safety-related, safety significant'.

NO regulatory controls have been applied to these non-safety-related, LOW and NRS categorized components, and upon grant of the Exemption, no regulatory controls would be added. Components in this category would still receive appropriate administrative controls to give reasonable assurance that these components will perform efficiently and reliably. The components whose additional controls are NONE equate directly to the proposed RISC-4 box, 'non-safety-related, low safety significant'.

Figure 3: Comparison of STP Programmatic Controls
to NRC Proposed Categorization and Treatment



Definitions to Enhance the Application Consistency of the Addendum 2 Deterministic Terms

Impact Terms –

High Impact – likely will result in core damage and/or negative impact on the health and safety of the public

Medium Impact – may, but is not likely to, result in core damage and/or negative impact on the health and safety of the public

Low Impact – a loss of a safety barrier will challenge the operator's response, but NO core damage or negative impact on the health and safety of the public is expected

Minor Impact – a loss of a safety barrier may challenge the operator's response, but NO core damage or negative impact on the health and safety of the public occurs

Insignificant Impact – a loss of a safety barrier is noted, but does not challenge the operator's response, and does not result in either core damage or an impact on the health and safety of the public

Frequency Terms –

Occurring Frequently – continuously or always demanded

Occurring Regularly – demanded more than 5 times per year

Occurring Occasionally – demanded once or twice per fuel cycle

Occurring Infrequently – demanded less than once per fuel cycle

Occurring Very Rarely – demanded once or less in the life of the plant

The Following Notes Also Apply to the Above Definitions –

1. Impact is the primary consideration in the deterministic risk categorization process. Frequency is used to adjust the response as required.
2. The above definitions attempt to capture the Working Group's evolved consensus on these deterministic terms. These terms will document the thought process used to date, and will add consistency to future discussions.
3. These terms serve only as an aid and guideline to the Working Group. If one or more critical question responses do not directly fit into the above definitions (i.e., EOPs), an overall correlation should be able to be drawn to consistently answer these questions.